EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-01

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014	OMEGA Model Updates
	Base Option Period Number 2	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 2f

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Jeff Cherry (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4371 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-01
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Optimization Model for reducing Emissions of Greenhouse gases from Automobiles (OMEGA) Updates
Period of Performance:	October 1, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Jeff Cherry 734-214-4371 cherry.jeff@epa.gov
Alternate WAM:	Anthony Neam 734-214-4201 neam.anthony@epa.gov

BACKGROUND

As part of the Office of Air and Radiation, EPA's Office of Transportation and Air Quality (OTAQ) administers portions of Title II of the Clean Air Act, as amended in 1977 and 1990. Within OTAQ, the Assessment and Standards Division (ASD) does a wide range of work in support of EPA's efforts in air quality analysis. These efforts include creating and revising emissions estimation models and other tools, developing regulatory impact analyses, testing vehicles, supporting the vehicle inspection and maintenance programs, and other related projects.

Onroad vehicles represent the largest portion of the nation's petroleum consumption and a very significant portion of the nation's total fossil fuel consumption. As such, onroad vehicles are significant contributors to the nation's greenhouse gas (GHG) emission inventory. Reducing these emissions will likely be a necessary part of any program aimed at controlling the nation's total contribution to global warming. The Clean Air Act specifies that determining an appropriate level of control of these emissions requires an accurate assessment and consideration of both the costs and benefits and due consideration of the leadtime necessary to implement such emission controls and their incorporation into the

onroad vehicle fleet. The wide variety of onroad vehicles and the range of available emission control technologies necessitate that any such assessments must be automated.

The current version of EPA's Optimization Model for reducing Emissions of Greenhouse gases from Automobiles (OMEGA) was developed under several work assignments in the EP-C-06-094 contract. The current model provides a broad set of calculations to support the reduction of on-road GHG emissions as described above. The model analyzes vehicle technology cost and effectiveness, as well as the benefits and impacts of potential programs.

SCOPE

The purpose of this work assignment is to fix elements of the current version of OMEGA that are not working as intended, to improve the operation of the core model, to further develop the input and output files, to update the Programmer Guide, and to integrate the OMEGA consumer choice module. The Contractor shall design, develop and test the model with the new capabilities in the tasks outlined below.

TASKS

Task 1: The contractor shall modify OMEGA so that the program can model relevant mobile source GHG regulations. This may include adding additional program features in order to reflect draft regulations. The contractor shall update the core model code as provided in written technical directives by EPA's Work Assignment Manager (WAM) to properly account for technology cost and effectiveness calculations. This may include modifying core algorithms of the model, the methodology used to apply technology, integrating additional modules, or other changes. The contractor shall fix any program bugs as needed.

Task 2: The contractor shall continue to improve the layout, structure, and content of the input and output files with written technical direction from EPA's WAM.

Task 3: The contractor shall update the Programmer Guide to include a full description of the layout of the program, including definitions of the objects, and how data gets transferred between different parts of the program code. The contractor shall provide additional model documentation as requested in written technical directives by the EPA WAM.

Task 4: The contractor shall modify the program interface as provided in written technical directives by the EPA WAM.

Task 5: The contractor shall develop an iterative automated interface between OMEGA and the OMEGA consumer choice module under written technical direction from EPA's WAM. This may include modifying the OMEGA model, the OMEGA consumer choice module, or integrating the models. The contractor shall make other maintenance, bug fix, and feature changes to the OMEGA consumer choice model as provided in written technical directives by EPA's WAM.

OTHER TERMS AND CONDITIONS

Confidentiality:

The Contractor shall not divulge any information acquired in the course of the work assignment with respect to data, output, EPA file structures, data processing activities or functions, user ID, passwords or any other knowledge that may be gained in the course of this work, to anyone who is not authorized by EPA to have access to such information. Also, due to the sensitive and sometimes confidential nature of the information processed, Contractor personnel shall sign appropriate confidentiality agreement forms, and shall be briefed as to which information requires special handling.

Non-Disclosure Agreement:

All documentation and work product provided by EPA or generated as a result of this project shall be under the control of the Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by US EPA.

DELIVERABLES

All deliverables shall be accurate and of professional quality and shall meet the requirements set forth in this WA/SOW and in the specific description of their attachments. The contractor shall work within the framework of this SOW, and shall comply with its requirements. The Contractor shall provide all source code and data tables used to develop specific applications. All products developed under this WA/SOW are the property of the US Environmental Protection Agency.

1. Quality Assurance Project Plan (QAPP)

2. Weekly meetings or email updates with EPA WAM, as needed, to discuss WA tasks and progress.

3. The Contractor shall continue to provide EPA with a running-and-under-development version of the model. EPA expects that modifications to the model may occur on a bi-weekly or monthly basis. The contractor shall provide EPA with updated versions of the model after each task has been completed. EPA will continue to own the OMEGA model.

4. The tasks shall be delivered to EPA WAM along with an updated version of the model including updated versions of the following, as necessary: Test documents and test results, the source code, executable applications/programs, and the instructions/mechanism for compiling the source code files and generating executables.

5. At the end of the performance period, the Contractor shall provide EPA WAM with an updated version of the model including a Programmer Guide, test documents and test results, the source code, executable applications/programs, any specialized testing suite used to validate/error check the software, and the instructions/mechanism for compiling the source code files and generating executables.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-02

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014	Uncertainty Analysis of Biofue
	Base Option Period Number 2	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Tasks 7 and 9

Purpose:
- ☒ Work Assignment
- ☐ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Aaron Levy (Signature) (Date)	Branch/Mail Code: Phone Number: 202-564-2993 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Vincent Camobreco (Signature) (Date)	Branch/Mail Code: Phone Number: 202-564-9043 FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-02
Issuing Office:	US Environmental Protection Agency
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Title:	Uncertainty Analysis of Biofuel Lifecycle GHG Emissions
Period of Performance:	October 1, 2013 – September 30, 2014

Work Assignment Contracting Officer Representative (WA COR):

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Alternate WAM:

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BACKGROUND

Pursuant to its responsibilities under the Energy Independence and Security Act of 2007 (EISA), Renewable Fuels Program (RFS) provisions, EPA undertakes lifecycle assessment of the greenhouse gas emissions associated with different types of renewable fuels. As directed by EISA, this analysis addresses the full fuel lifecycle of biofuels, including all stages of production, distribution and consumption. A key piece of the analysis, as directed by EISA, is inclusion of significant indirect effects, such as indirect land use change impacts associated with producing biofuel feedstock. EPA's approach is to use the best tools and models available to estimate GHG emissions related to each component of the fuel lifecycle.

While EPA believes the lifecycle methodology developed for the March 2010 RFS2 final rulemaking represents a robust and scientifically credible approach, EPA recognizes that some calculations of GHG emissions are relatively straightforward, while others are associated with more uncertainty. EPA has previously worked with the Contractor to develop a stochastic spreadsheet model to quantify key areas of uncertainty related to indirect land use change GHG emissions. For this work assignment, the Contractor shall continue to operate and update the stochastic spreadsheet model used by EPA.

SCOPE
The WA COR will review all deliverables in draft form and provide revisions and/or comments to the Contractor. The Contractor shall prepare the final deliverables incorporating the WA COR's comments.

Contractor personnel shall at all times identify themselves as Contractor employees and shall not present themselves as EPA employees. They shall not represent the views of the U.S. Government, EPA, or its employees. In addition, the Contractor shall not engage in inherently governmental activities, including but not limited to actual determination of EPA policy and preparation of documents on EPA letterhead.

TASKS
Task 1 - Perform stochastic scenario analyses to quantify uncertainty in land use change GHG emissions
The Contractor shall run the Biofuels Stochastic international land use Lifecycle Analysis Model (BSLAM) to quantify uncertainty in biofuel-induced land use change GHG emissions. The WA COR will provide written technical direction to the Contractor for each scenario, including the necessary model inputs and scenario specifications. The Contractor shall implement minor adjustments and run the BSLAM given the requirements of each scenario as specified by the WA COR in the technical direction.

Based upon the written technical direction from the WA COR, the Contractor shall run the BSLAM and ensure that the model performs appropriately. As part of each scenario analysis, the Contractor shall perform quality assurance (QA) on the model results and provide a QA report to the WA COR documenting the QA procedures implemented and the findings from the QA process. The Contractor shall provide the scenario analysis results in electronic format through email to the WA COR. Results shall include the model outputs, such as total land use change GHG emissions with 95% confidence internals for each scenario, as well as disaggregated GHG emissions by region, time period, and land conversion type.

The Contractor shall prepare reports documenting the scenario analysis results for some but not all of the scenario analyses performed. Approximately 2-3 separate reports (approx. 5-10 pages each) will be required during the period of performance. The WA COR will provide written technical direction to the Contractor with the requirements for each report. The reports delivered to the WA COR shall explain the analyses and results in plain English with technical details (e.g., complex equations) included in Appendices as appropriate.

Deliverables and schedule under Task 1

2a. Provide scenario analysis results to the WA COR within 5 business days after the WA COR submits technical direction

2b. Submit a QA report to the WA COR within 5 business days after the scenario analysis results are delivered to the WA COR

2c. Deliver a draft scenario analysis report to the WA COR within 15 business days after the WA COR submits technical direction

2d. Submit a final scenario analysis report to the WA COR within 5 business days after the WA COR submits comments on the draft report

Task 2 – Update the stochastic model

The Contractor shall update the BSLAM based on written technical direction from the WA COR. The WA COR shall provide updated datasets for the model to the Contractor as appropriate. New datasets to incorporate into the model will include updated shrubland, savanna and grassland carbon stocks and other updates to the data inputs that determine land conversion emissions factors. The Contractor shall input the data sets provided into the BSLAM and ensure that the model performs appropriately with the updated information. To evaluate model performance, the Contractor shall compare results from the updated model with results from previous versions. The Contractor shall also update the BSLAM documentation to reflect the updates completed. The Contractor shall provide the updated spreadsheet model and model documentation to the WA COR in electronic format.

The Contractor shall participate in monthly update calls with the WA COR to discuss the progress made in completing Task 2. The WA COR will provide written technical direction specifying the details of the monthly update calls. More frequent update calls may be necessary during certain stages of the period of performance, in which case the additional update calls will be specified in written technical direction from the WA COR.

Deliverables and schedule under Task 2

3a. Monthly update calls with the WA COR to discuss progress being made in completing Task 2.

3b. Provide a draft version of the updated BSLAM model and documentation, including a QA report, to the WA COR by September 1, 2014.

3c. Provide a final version of the updated BSLAM model and documentation, including a QA report, to the WA COR by September 30, 2014.

Task 3 – Quick turn-around and technical support

The Contractor shall provide specialized expertise on uncertainty assessment, or perform model runs, on an ad hoc basis to: (i) consult with EPA on various aspects of uncertainty associated with lifecycle GHG analysis of biofuels and related modeling, (ii) review, summarize and critique academic literature and other research related to uncertainty associated with lifecycle GHG analysis of biofuels, (iii) perform quick-turn modeling or quantitative analysis related to uncertainty assessment, (iv) prepare presentations and present analyses to EPA staff and stakeholders, and (v) revise existing analyses and reports. These quick response tasks may require the involvement of collaborative researchers who have expertise identified in the Statement of Work. Quick turn-around tasks are expected to take 1-2 weeks each, but some quick-turn around tasks may require deliverables from the Contractor in 24-48 hours. The details and schedule of deliverables for these quick turnaround and technical support requests will be included in written technical direction from the WA COR. The total expected level of effort on this task would be 32 hours.

Deliverables and schedule under Task 3

5a. Deliver draft results of the quick turn-around technical support within 5 business days after the WA COR submits technical direction

5b. Deliver final results of quick turn-around technical support within 5 business data after the WA COR provides comments on the draft results

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-03

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Powertrain Tests and Validatio

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 2

Purpose:
- ☒ Work Assignment
- ☐ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/12/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling

	Contract Period:	Cost/Fee:	LOE:
	02/01/2012 To 09/30/2014		
This Action:			
Total:			

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee:	LOE:
Cumulative Approved:	Cost/Fee:	LOE:

Work Assignment Manager Name: Houshun Zhang (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4214 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-03
Title:	Powertrain Tests and Validation
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 12, 2013 – September 30, 2014
Work Assignment Contracting Officer Representative (WA COR):	Houshun Zhang (734) 214-4214 Zhang.houshun@epa.gov
Alternate WAM:	Christine Brunner (734) 214-4287 Brunner.christine@epa.gov

I. BACKGROUND

The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) recently announced a first-ever program to reduce greenhouse gas (GHG) emissions and improve fuel efficiency of heavy-duty trucks and buses. This program is the first phase of the multi-stage GHG reduction approach. Hybrid system certification is part of the program. Due to technical challenges to quantify hybrid vehicle benefits as opposed to conventional vehicles, the agencies, working together with industrial stakeholders, are developing different concepts for certification. One of the concepts is powertrain test or powerpack test approach. The powertrain system includes engine, hybrid related components, and transmission. This approach must rely on a conventional baseline for use of comparison with the new hybrid system. The challenge is how to select, test, and validate this conventional powertrain baseline system without the hybrid system. To date very little work has been done in this area. Consequently, this work assignment will spearhead the efforts to select, test, and validate the baseline powertrain system before moving to the more complicated hybrid system.

This work assignment (WA) continues work started under WAs 0-03 and 1-03 of this contract. It adds related work in order to enhance program objectives with additional tangible deliverables in a timely manner.

II. SCOPE OF WORK

The contractor shall provide all required management, employee training, licensed personnel, permits, equipment, labor, materials, tools, personal protective equipment, and other items needed to accomplish each task. As novel and unexpected results may occur due to the nature of the work, the EPA WAM may provide technical direction via phone, email or in person followed-up with written technical direction during testing.

Task numbering under this WA follows the sequence of the last task number in WA 1-03, Amendment 2.

Task 9 Constant speed road load force measurements with torque wheels

The contractor shall conduct a constant speed test to determine truck aerodynamic drag coefficient and rolling resistance. The contractor shall use the class 8 truck for this task. This task requires the use of four High Resolution Truck Torque Wheel Transducers with approximate 5 lb-ft. resolution. Additional requirements include mechanical protection against high torque application (both acceleration and braking) telemetry, and associated wheel adapters, encoder, amplifier, and power supply. All hardware purchased under this task shall become government property.

The contractor shall collect relative wind speed data during coastdowns using an anemometer mounted on the trailer approximately 1 meter above the trailer roof, at the midpoint of the trailer width, and within 0-2 meters of the front of the trailer. The anemometer shall be approved by the EPA WAM before being used.

The contractor shall provide EPA WAM with grade data along the location of track or road where testing is performed. If the grade is constant through the length of track or road over which the tests are conducted, the contractor may instead provide this constant value. If the EPA WAM determines this value is insufficient, then the contractor upon written technical direction from the EPA WAM shall provide the location-specific grade.

The contractor shall conduct the test on the Kenworth T700 truck (VIN XKFD49XXDJ342758) and trailer rig that the contractor has tested using the CFR 1066.310 Coastdown Test Procedure. The contractor shall perform the test on the coastdown road that was used for the previous tests on this truck. The test requires making two laps (one run in each direction) of 1 mile in length at steady state speeds in this order 70, 10, 20, 30, 40, 50, 60, 70, 60, 50, 40, 30, 20, 10, 70 mph while recording torque and engine power OBD information. After the test program, the contractor shall remove the instrumentation and return the truck to production configuration.

Task 10 DD15AT Engine Benchmark

The contractor shall test a 2013 Detroit Diesel DD15AT engine with the highest power rating on market. The contractor shall first identify the potential highest and lowest rating the DD15 engine can run. Once the boundary of the rating is identified, the contractor shall get new calibrations to refresh the engine control module (ECM), where the new calibrations can be obtained from either a dealer or from Detroit Diesel for all possible ratings between the lowest and highest ratings.

The contractor shall conduct engine mapping at the highest rating. The operating points shall cover the following:

- Full torque curve as a function of engine speeds from idle to highest speed.
- Speed range: idle to highest possible speed in the following format:
  - idle,700,800,900,1000,1100,1200,1250,1300,1400,1500,1550,1600,1700,1800,1950, 2100
  - Two more speed points from the rated speed to the speed close to or at governor limited speed.
- Load range: 100%, 90%, 75%, 60%, 50%, 35%, 25%, 10%, 5%, 0% at each speed.
- Engine friction torque curve
  - Motoring curve as function of speed from idle to rated speed

The contractor shall run the following tests at each rating:

- The full torque curve as function of the engine speed. These torque curves will be used to get the engine fuel maps for each rating.
- Supplemental Emissions Test (SET) for all 13 modes and calculated composite brake specific fuel consumption (BSFC) and CO2 based on measurements
- Hot FTP cycles with measured BSFC and CO2
- World-harmonized test cycle (WHTC) with measured BSFC and CO2
- EPA-certified CARB cycle with measured BSFC and CO2

For the CARB cycle, the EPA WAM will provide the engine torque and speed to the contractor. This information will be obtained from the vehicle simulation, allowing for a simulated vehicle run using the engine dyno. For all cycles, three repeatable runs are required.

Task 11 ISB Engine Benchmark

For this task, the contractor shall use the Cummins ISB engine being used in the powertrain dyno cell, which has a 300hp rating. The contractor shall identify the potential highest and lowest rating the ISB engine can run. Once the boundary of the rating is identified, the contractor shall get new calibrations to refresh the engine control module (ECM), where the new calibrations can be obtained from either dealer or Cummins for all possible ratings between the lowest and highest ratings.

The contractor shall conduct engine mapping at the highest rating. The operating points shall include:

- Full torque curve as function of engine speeds from idle to highest speed
- Speed range: idle to highest possible speed in the following format
  - Idle, 750, 900, 1050,1200,1350,1500,1650,1800,1950, 2100, 2250, 2400, 2550 with 150rpm interval until the top end of engine rpm is reached.
  - Two more speed points from the rated speed to the speed close to or at governor limited speed.
- Load range: 100%, 90%, 75%, 60%, 50%, 35%, 25%, 10%, 5%, 0% at each speed
- Engine friction torque curve
  - Motoring curve as function of speed from idle to rated speed

The contractor shall confirm this assumption through Cummins technical support.

The contractor shall run the following tests at each rating:

- The full torque curve as function of the engine speed. These torque curves will be used to get the engine fuel maps for each rating.

- SET for all 13 modes and calculated composite BSFC and CO2 based on measurements.
- Hot FTP cycles with measured BSFC and CO2.
- World-harmonized test cycle (WHTC) with measured BSFC and CO2.
- EPA-certified CARB cycle with measured BSFC and CO2.

For the CARB cycle, the EPA WAM will provide the engine torque and speed to the contractor. This information will be obtained from the vehicle simulation, allowing for a simulated vehicle run using the engine dyno. For all cycles, three repeatable runs are required.

Task 12 Chassis dyno test and text matrix on tow truck (Optional)

Note: The contractor shall provide a separate cost estimate for this task. In addition, the contractor shall only start this task upon receipt of written technical direction from the EPA WAM.

The contractor shall put the engine and transmission from the powertrain dyno cell back into the F650 tow truck. The contractor shall then perform the baseline tests in a chassis dyno, making sure that the re-assembled truck can duplicate the results obtained before the powertrain was removed from the truck.

After validating the truck (i.e., obtaining duplicate results as mentioned above), the contractor shall follow the exact procedure described in Task 1 of U.S. EPA BPA 09-02, Contract No. GS-07F-6087P, to conduct chassis dyno tests according to the test matrix. The EPA WAM will provide this procedure through written technical direction. All chassis dyno tests shall be done without the measurement of CH_4 and N_2O. In order to match the road coast down data, the data of the chassis dyno coast down shall be recorded together with all final sets of dyno-set coefficients as, well as the dyno-set inertias.

Extensive statistical analyses shall be conducted for a comparison between powertrain and chassis dyno tests. Variability between these two dyno tests shall be analyzed in detail. The sources of variability shall be identified together with recommended solutions in reducing potential variability.

IV. DELIVERABLES

1. Kick-off Meeting

Within one week after the WA is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Develop Quality Assurance Project Plan

The contractor shall submit a draft QAPP to the EPA WAM within 15 days of Work Plan approval. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The QAPP approved under WA 1-03 may be used as a starting point and modified to include additional activity contained in this WA 2-03. The EPA WAM shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received from the EPA WAM and shall submit a final QAPP within 15 days after receipt of EPA comments. Guidance can be found at: QAPP for use of existing data: http://www.epa.gov/quality/qs-docs/found-data-qapp-rqts.pdf; Assessment Factors for relevance, applicability, utility of existing

data: http://www.epa.gov/spc/pdfs/assess2.pdf; and EPA Requirements for QAPPs: http://www.epa.gov/quality/qs-docs/r5-final.pdf.

The final QAPP shall cover all aspects of this test program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein. The contractor shall notify the EPA WAM immediately if they encounter any equipment failures that cannot be remedied, problems that may impact the quality or on-time receipt of deliverables, or unavailability of items required for this work assignment.

3. Regular Progress Reports

The contractor shall provide the EPA WAM with regular status reports via telephone conference or email during the period of performance. The frequency of the progress report can be adjusted as weekly or bi-weekly depending on the progress of the program. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

4. Technical Reports

The contractor shall provide the EPA WAM with a brief Technical Report upon completion of each task. Depending on the complexity of the subject matter and as directed via written technical direction by the EPA WAM, these reports shall be in the form of either a presentation or a formal written document. Written products shall be delivered in formats specified by the EPA WAM (e.g., Word, Excel).

5. Data

The contractor shall provide the EPA WAM with raw test data within 2 business days of receiving request for such data via written technical direction from the EPA WAM. The contractor shall provide to the EPA WAM valid test data from a vehicle (per task) within 14 days of completion of the testing on the vehicle. All data shall be presented in Excel format.

6. Draft and Final Reports

The contractor shall provide to the EPA WAM a Draft Final Report and data set summarizing the results of all tasks within 30 days of completion of the laboratory and modeling work contained in this work assignment. The contractor shall deliver the Final Report within 15 days of receipt of comments from the EPA WAM. All reports and associated materials (e.g., data sets) shall be provided in formats specified by the EPA WAM.

Schedule of Deliverables

Deliverable	Completion Date
Kick-off Meeting	Within 1 week of receipt of work assignment
QAPP submission	Within 15 days of receipt of Work Plan approval
Final QAPP	Within 15 days of receiving EPA comments
Complete all tasks	Before April 30, 2014
Test Data	Raw data - within 2 business days of EPA WAM request Vehicle test data - within 14 days of completion of the testing on a vehicle
Draft Final Report	Within 30 days of completion of all tasks
Final Report	Within 15 days of receipt of EPA comments on Draft Final Report

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-03

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Powertrain Tests and Validatio

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 2

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/12/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

SFO (*Max 2*): ☐

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2014		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Houshun Zhang (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4214 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-03, Amendment 1
Title:	Powertrain Tests and Validation
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 12, 2013 – September 30, 2014
Work Assignment Contracting Officer Representative (WA COR):	Houshun Zhang (734) 214-4214 Zhang.houshun@epa.gov
Alternate WAM:	Christine Brunner (734) 214-4287 Brunner.christine@epa.gov

I. BACKGROUND

The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) recently announced a first-ever program to reduce greenhouse gas (GHG) emissions and improve fuel efficiency of heavy-duty trucks and buses. This program is the first phase of the multi-stage GHG reduction approach. Hybrid system certification is part of the program. Due to technical challenges to quantify hybrid vehicle benefits as opposed to conventional vehicles, the agencies, working together with industrial stakeholders, are developing different concepts for certification. One of the concepts is powertrain test or powerpack test approach. The powertrain system includes engine, hybrid related components, and transmission. This approach must rely on a conventional baseline for use of comparison with the new hybrid system. The challenge is how to select, test, and validate this conventional powertrain baseline system without the hybrid system. To date very little work has been done in this area. Consequently, this work assignment will spearhead the efforts to select, test, and validate the baseline powertrain system before moving to the more complicated hybrid system.

This work assignment (WA) continues work started under WAs 0-03 and 1-03 of this contract. It adds related work in order to enhance program objectives with additional tangible deliverables in a timely manner.

II. SCOPE OF WORK

The contractor shall provide all required management, employee training, licensed personnel, permits, equipment, labor, materials, tools, personal protective equipment, and other items needed to accomplish each task. As novel and unexpected results may occur due to the nature of the work, the EPA WAM may provide technical direction via phone, email or in person followed-up with written technical direction during testing.

Task numbering under this WA follows the sequence of the last task number in WA 1-03, Amendment 2.

Task 9 Constant speed road load force measurements with torque wheels

The contractor shall conduct a constant speed test to determine truck aerodynamic drag coefficient and rolling resistance. The contractor shall use the class 8 T700 and Cascadia trucks for this task. This task requires the use of four High Resolution Truck Torque Wheel Transducers with approximate 5 lb-ft. resolution. Additional requirements include mechanical protection against high torque application (both acceleration and braking) telemetry, and associated wheel adapters, encoder, amplifier, and power supply. All hardware purchased under this task shall become government property.

The contractor shall use a driveshaft torque sensor (strain gauge) to measure torque during the testing of each of the trucks. The driveshaft sensors and wheel hub meters can collect data simultaneously. The torque sensors shall be calibrated according to procedures stated in CFR §1065.310.

The contractor shall collect relative wind speed data during coastdowns using an anemometer mounted on the trailer approximately 1 meter above the trailer roof, at the midpoint of the trailer width, and within 0-2 meters of the front of the trailer. The anemometer shall be approved by the EPA WAM before being used.

The contractor shall provide EPA WAM with grade data along the location of track or road where testing is performed. If the grade is constant through the length of track or road over which the tests are conducted, the contractor may instead provide this constant value. If the EPA WAM determines this value is insufficient, then the contractor upon written technical direction from the EPA WAM shall provide the location-specific grade.

The contractor shall conduct the test on each truck and trailer rig that the contractor has tested using the CFR §1066.310 Coastdown Test Procedure. The contractor shall perform the test on the coastdown road that was used for the previous tests on this truck. The test requires making two laps (one run in each direction) of 1 mile in length at steady state speeds in this order 70, 10, 20, 30, 40, 50, 60, 70, 60, 50, 40, 30, 20, 10, 70 mph while recording torque and engine power OBD information. After the test program, the contractor shall remove the instrumentation and return the truck to production configuration.

Task 10 Heavy Duty Engine Benchmark

The contractor shall test either a 2013 Detroit Diesel DD15AT or Navistar Maxxforce 13 engine with the highest power rating on market. The contractor shall first identify the potential highest and lowest rating the engine can run. Once the boundary of the rating is identified, the contractor shall get new calibrations to refresh the engine control module (ECM), where the new

calibrations can be obtained from either a dealer or from the original equipment manufacturer (OEM) for all possible ratings between the lowest and highest ratings.

The contractor shall conduct engine mapping at the highest rating. The operating points shall cover the following:

- Full torque curve as a function of engine speeds from idle to highest speed.
- Speed range: idle to highest possible speed in the following format:
  - idle,700,800,900,1000,1100,1200,1250,1300,1400,1500,1550,1600,1700,1800,1950, 2100
  - Two more speed points from the rated speed to the speed close to or at governor limited speed.
- Load range: 100%, 90%, 75%, 60%, 50%, 35%, 25%, 10%, 5%, 0% at each speed.
- Engine friction torque curve
  - Motoring curve as function of speed from idle to rated speed

The contractor shall run the following tests at each rating:

- The full torque curve as function of the engine speed. These torque curves will be used to get the engine fuel maps for each rating.
- Supplemental Emissions Test (SET) for all 13 modes and calculated composite brake specific fuel consumption (BSFC) and CO2 based on measurements
- Hot FTP cycles with measured BSFC and CO2
- World-harmonized test cycle (WHTC) with measured BSFC and CO2
- EPA-certified CARB cycle with measured BSFC and CO2

For the CARB cycle, the EPA WAM will provide the engine torque and speed to the contractor. This information will be obtained from the vehicle simulation, allowing for a simulated vehicle run using the engine dyno. For all cycles, three repeatable runs are required.

Task 11 ISB Engine Benchmark

For this task, the contractor shall use the Cummins ISB engine being used in the powertrain dyno cell, which has a 300hp rating. The contractor shall identify the potential highest and lowest rating the ISB engine can run. Once the boundary of the rating is identified, the contractor shall get new calibrations to refresh the engine control module (ECM), where the new calibrations can be obtained from either dealer or Cummins for all possible ratings between the lowest and highest ratings.

The contractor shall conduct engine mapping at the highest rating. The operating points shall include:

- Full torque curve as function of engine speeds from idle to highest speed
- Speed range: idle to highest possible speed in the following format
  - Idle, 750, 900, 1050,1200,1350,1500,1650,1800,1950, 2100, 2250, 2400, 2550 with 150rpm interval until the top end of engine rpm is reached.
  - Two more speed points from the rated speed to the speed close to or at governor limited speed.
- Load range: 100%, 90%, 75%, 60%, 50%, 35%, 25%, 10%, 5%, 0% at each speed
- Engine friction torque curve
  - Motoring curve as function of speed from idle to rated speed

The contractor shall confirm this assumption through Cummins technical support.

The contractor shall run the following tests at each rating:

- The full torque curve as function of the engine speed. These torque curves will be used to get the engine fuel maps for each rating.
- SET for all 13 modes and calculated composite BSFC and CO2 based on measurements.
- Hot FTP cycles with measured BSFC and CO2.
- World-harmonized test cycle (WHTC) with measured BSFC and CO2.
- EPA-certified CARB cycle with measured BSFC and CO2.

For the CARB cycle, the EPA WAM will provide the engine torque and speed to the contractor. This information will be obtained from the vehicle simulation, allowing for a simulated vehicle run using the engine dyno. For all cycles, three repeatable runs are required.

Task 12 Chassis dyno test and text matrix on tow truck (Optional)

The contractor shall put the engine and transmission from the powertrain dyno cell back into the F650 tow truck. The contractor shall then perform the baseline tests in a chassis dyno, making sure that the re-assembled truck can duplicate the results obtained before the powertrain was removed from the truck.

After validating the truck (i.e., obtaining duplicate results as mentioned above), the contractor shall follow the exact procedure described in Task 1 of U.S. EPA BPA 09-02, Contract No. GS-07F-6087P, to conduct chassis dyno tests according to the test matrix. The EPA WAM will provide this procedure through written technical direction. All chassis dyno tests shall be done without the measurement of CH_4 and N_2O. In order to match the road coast down data, the data of the chassis dyno coast down shall be recorded together with all final sets of dyno-set coefficients as, well as the dyno-set inertias.

Extensive statistical analyses shall be conducted for a comparison between powertrain and chassis dyno tests. Variability between these two dyno tests shall be analyzed in detail. The sources of variability shall be identified together with recommended solutions in reducing potential variability.

IV. DELIVERABLES

1. Develop Quality Assurance Project Plan

The contractor shall submit a draft QAPP to the EPA WAM within 15 days of Work Plan approval. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The QAPP approved under WA 1-03 may be used as a starting point and modified to include additional activity contained in this WA 2-03. The EPA WAM shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received from the EPA WAM and shall submit a final QAPP within 15 days after receipt of EPA comments. Guidance can be found at: QAPP for use of existing data: http://www.epa.gov/quality/qs-docs/found-data-qapp-rqts.pdf; Assessment Factors for relevance, applicability, utility of existing data: http://www.epa.gov/spc/pdfs/assess2.pdf; and EPA Requirements for QAPPs: http://www.epa.gov/quality/qs-docs/r5-final.pdf.

The final QAPP shall cover all aspects of this test program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein. The contractor shall notify the EPA WAM immediately if they encounter any equipment failures that cannot be remedied, problems that may impact the quality or on-time receipt of deliverables, or unavailability of items required for this work assignment.

2. Regular Progress Reports

The contractor shall provide the EPA WAM with regular status reports via telephone conference or email during the period of performance. The frequency of the progress report can be adjusted as weekly or bi-weekly depending on the progress of the program. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

3. Technical Reports

The contractor shall provide the EPA WAM with a brief Technical Report upon completion of each task. Depending on the complexity of the subject matter and as directed via written technical direction by the EPA WAM, these reports shall be in the form of either a presentation or a formal written document. Written products shall be delivered in formats specified by the EPA WAM (e.g., Word, Excel).

4. Data

The contractor shall provide the EPA WAM with raw test data within 2 business days of receiving request for such data via written technical direction from the EPA WAM. The contractor shall provide to the EPA WAM valid test data from a vehicle (per task) within 14 days of completion of the testing on the vehicle. All data shall be presented in Excel format.

5. Draft and Final Reports

The contractor shall provide to the EPA WAM a Draft Final Report and data set summarizing the results of all tasks within 30 days of completion of the laboratory and modeling work contained in this work assignment. The contractor shall deliver the Final Report within 15 days of receipt of comments from the EPA WAM. All reports and associated materials (e.g., data sets) shall be provided in formats specified by the EPA WAM.

Schedule of Deliverables

Deliverable	Completion Date
QAPP submission	Within 15 days of receipt of Work Plan approval
Final QAPP	Within 15 days of receiving EPA comments
Complete all tasks	Before April 30, 2014
Test Data	Raw data - within 2 business days of EPA WAM request Vehicle test data - within 14 days of completion of the testing on a vehicle
Draft Final Report	Within 30 days of completion of all tasks
Final Report	Within 15 days of receipt of EPA comments on Draft Final Report

NON-DISCLOSURE AGREEMENT
All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-03

☐ Other ☒ Amendment Number: 000002

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Powertrain Tests and Validatio

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 2 Light Duty and Heavy Duty Vehicle Analysis

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/12/2013 To 09/30/2014

Comments:
This WA 2-03, Amendment 2 adds Task 9.1 and reduces the scope of Task 12. All other tasks remain unchanged.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2014		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Houshun Zhang (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4214 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-03, Amendment 2
Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Powertrain Tests and Validations
Work Assignment Contracting Officer Representative (WA COR)	Houshun Zhang 734-214-4214 zhang.houshun@epa.gov
Alternate WA COR	Christine Brunner 734-214-4287 brunner.christine@epa.gov

SCOPE OF WORK

This amendment 2 to WA 2-03 makes the following revisions: 1) adds Task 9.1 to Task 9, and 2) modifies (reduces) Task 12. Task 12 contained in this WA 2-03, Amendment 2 shall replace the previous Task 12 in its entirety. All other tasks not specified in this Amendment 2 remain unchanged.

TASKS

Task 9.1 Constant speed road load force measurements with driveshaft torque sensor

The contractor shall conduct a constant speed test to determine truck aerodynamic drag coefficient and rolling resistance. The truck under this task is Cascadia truck only. The contractor shall only use a driveshaft torque sensor (strain gauge) to measure torque during the testing of each of the trucks. The driveshaft sensors and wheel hub meters can collect data simultaneously. The torque sensors shall be calibrated according to procedures stated in §1065.310.

The contractor shall collect relative wind speed data during coastdowns using an anemometer mounted on the trailer approximately 1 meter above the trailer roof, at the midpoint of the trailer width, and within 0-2 meters of the front of the trailer. The anemometer shall be approved by the EPA WA COR before being used.

The contractor shall provide EPA WA COR with grade data along the location of track or road where testing is performed. If the grade is constant through the length of track or road over which the tests are conducted, the contractor may instead provide this constant value. If EPA WA COR determines this value is insufficient, then the contractor upon written technical direction from the EPA WA COR shall provide the location-specific grade.

The contractor shall conduct the test on each truck and trailer rig that the contractor has tested using the CFR 1066.310 Coastdown Test Procedure. The contractor shall perform the test on the coastdown road that was used for the previous tests on this truck. The test requires making two laps (one run in each direction) of 1 mile in length at steady state speeds in this order 70, 10, 20, 30, 40, 50, 60, 70, 60, 50, 40, 30, 20, 10, 70 mph while recording torque and engine power OBD information. After the test program, the contractor shall remove the instrumentation and return the truck to production configuration.

Task 12 Chassis dyno test and text matrix on tow truck (Optional)

The contractor shall put the engine and transmission from the powertrain dyno cell back into the F650 tow truck. The contractor shall then perform the baseline tests in a chassis dyno, making sure that the re-assembled truck can duplicate the results obtained before the powertrain was removed from the truck.

After validating the truck (i.e., obtaining duplicate results as mentioned above), the contractor shall follow the exact procedure described in Task 1 of U.S. EPA BPA 09-02, Contract No. GS-07F-6087P, to conduct chassis dyno tests according to the test matrix. The EPA WA COR will provide written technical direction on what shall be included in the test matrix. This test matrix may consist of up to six vehicle driving cycles and up to seven vehicle parameters, such as rolling resistance, aero drag coefficient, and weight. The contractor shall not begin work on the chassis dyno tests until written technical direction is received regarding the test matrix driving cycles and vehicle parameters.

All chassis dyno tests shall be done without the measurement of CH_4 and N_2O. In order to match the road coast down data, the data of the chassis dyno coast down shall be recorded together with all final sets of dyno-set coefficients as, well as the dyno-set inertias.

Extensive statistical analyses shall be conducted for a comparison between powertrain and chassis dyno tests. Variability between these two dyno tests shall be analyzed in detail. The sources of variability shall be identified together with recommended solutions in reducing potential variability.

Schedule of Deliverables

Test Data	Raw Data – within 2 business days of EPA WA COR request Vehicle test data – within 14 days of completion of the testing on a vehicle

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-04

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2015	Aerodynamic Trailer Assessment
	Base Option Period Number 2	

Contractor	Specify Section and paragraph of Contract SOW
ICF Incorporated, L.L.C.	Task 2a

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 08/11/2014 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Contract Period:	Cost/Fee:	LOE:
	02/01/2012 To 09/30/2015		
This Action:			
Total:			

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee:	LOE:
Cumulative Approved:	Cost/Fee:	LOE:

Work Assignment Manager Name: Arvon Mitcham (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4522 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-04
Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work Title:	Aerodynamic Trailer Component Assessment and Impact on the Green House Gas Emissions from Heavy-Duty Combination Vehicles
Work Assignment Contract Officer Representative (WA COR):	Arvon Mitcham 2000 Traverwood Drive Ann Arbor, MI 48105 734-214-4522 mitcham.arvon@epa.gov
Alternate WA COR:	Houshun Zhang 2000 Traverwood Drive Ann Arbor, MI 48105 734-214-4214 zhang.houshun@epa.gov
Period of Performance:	August 11, 2014 – September 30, 2014

I. BACKGROUND

On September 15, 2011, the United States Environmental Protection Agency (U.S. EPA) and the National Highway Traffic Safety Administration (NHTSA) published a final rulemaking establishing Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles (HD GHG Phase 1). This program was the first of its kind focused on reducing greenhouse gas (GHG) emissions and improving the fuel efficiency of heavy-duty trucks and buses; it is projected to reduce CO2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model year 2014 to 2018 vehicles.

As part of this rulemaking effort, an emphasis was placed on reducing the aerodynamic drag of heavy-duty trucks, specifically Class 7 and 8 combination tractors. Class 7 and 8 combination tractors and their engines contribute the largest portion of the total GHG emissions and fuel consumption (approximately 65 percent) of the heavy-duty sector, due to their large payloads, their high annual miles traveled, and their major role in national freight transport. Based on empirical studies of Class 8 Tractors, a 1% improvement in aerodynamic drag equates to a 0.5% improvement in fuel economy, and consequently equates to lower GHG emissions for HD Class 8 Tractor-Trailer combinations. Therefore, reducing the amount of aerodynamic drag on a Class 7/8 combination tractor-trailer reduces the GHG emissions, fuel consumption, and overall operating cost for a Class 7/8 combination tractor.

EPA is now developing a second phase of HD GHG regulations (HD GHG Phase 2). As done previously in HD GHG Phase 1, reduction in aerodynamic drag on a Class 7/8 combination tractor trailer will be a major focus. Specifically, EPA is considering including HD trailers as part of the rule to further increase fuel economy and lower GHG emissions from Class 7/8 Tractor-Trailer combinations. This allows EPA to take a systems approach by looking at the tractor-trailer combination as an entire vehicle, not just focusing on the Class 7/8 engine and tractor separately from the trailer. The inclusion of trailers should provide additional benefits in HD GHG Phase 2 and build on the success and achievements in HD GHG Phase 1.

II. SCOPE

For HD GHG Phase 2, we need to evaluate 1) the relationship between aerodynamic trailer devices and fuel consumption/CO2 emissions and 2) the cost-benefit of including trailers used with Class 7/8 tractors for HD GHG Phase 2. Determining the costs and potential benefits of aftermarket or original equipment trailer aerodynamic devices (e.g., side skirts, boat tails, and front trailer treatments) is required to improve vehicle aerodynamic performance and reduce GHG emissions of HD Class 7/8 Tractor-Trailer combinations.

The various aerodynamic methods from HD GHG Phase 1 (e.g., coastdown, reduced scale wind tunnels) shall be used to evaluate and characterize the performance of trailers and trailer aero technology and feed this into EPA's Greenhouse Gas Emissions Model (GEM)[1] to determine the potential GHG impact and output, and assist in HD GHG Phase 2 standard setting. This shall require:

1. On-Road Evaluation using the Coastdown and Constant Speed on full-size, Class 7/8Tractor Trailer combinations with and without aerodynamic trailer devices installed, individually and in combination, to quantify the aerodynamic drag change aerodynamic trailer devices;
2. Wind Tunnel Evaluation of 1/8th (12.5%) scale Class 7/8 Tractor-Trailer combinations with and without aerodynamic trailer devices installed, individually and in combination, to quantify the aerodynamic drag change from aerodynamic trailer devices; and
3. Cost and cost-benefit analysis of the various aftermarket or OEM trailer aerodynamic devices (e.g., side skirts, boat tails, front trailer treatments).

III. TASKS

The tasks below outline the functions that shall be performed by the contractor under this work assignment. Tasks 5 and 6 shall be performed by the contractor only after receipt of written technical direction from the EPA WA COR. However, the contractor shall provide cost information for each task and sub-task in the work plan.

In the event that the contractor estimates the required tasks will not be completed in the current period of performance, the contractor shall submit a work plan and cost proposal for the work that is anticipated to be completed during the current period of performance, and a separate work plan and cost proposal for the work that is anticipated to carry over into the next term. The contractor shall include the specific tasks and/or subtasks and corresponding timing for work to be completed during the current performance period and the carry-over work in the respective work plans.

[1] EPA's Greenhouse Gas Emissions Model (GEM) is a free, desktop computer application that estimates the GHG emissions and fuel efficiency performance of specific aspects of heavy duty vehicles based on the manufacturer inputs of aerodynamic drag engine fuel map, tire rolling distance, weight reduction, and extended idle strategy for each tractor model in the manufacturer's fleet.

The contractor shall provide all required management, employee training, licensed personnel, permits, equipment, labor, materials, tools, personal protective equipment, and other items needed to accomplish each task. As novel and unexpected results may occur due to the nature of the work, the EPA WA COR may provide technical direction via phone, email or in person, followed-up with written technical direction.

Task 1: Tractor Trucks, Trailers, Trailer Aerodynamic Devices and Equipment

The tests specified in this work assignment shall be conducted on various OEM highway Class 8 sleeper and day cab tractor trucks equipped with an aerodynamic package with a standard (non- SmartWay) 53' foot box trailer. Specifically, the on-road tests shall be conducted with one OEM on-highway Class 8 sleeper cab and day cab tractor truck equipped with an aerodynamic package; with a standard (non-SmartWay) 53' foot box trailer. In addition, the reduced-scale wind tunnel (RSWT) testing shall be conducted with four OEM on-highway Class 8 sleeper cabs and one day cab tractor truck equipped with an aerodynamic package; with three standard (non- SmartWay) 53' foot box trailers. The trailers shall be tested in standard configuration and with various aerodynamic trailer devices installed according to the test plans supplied by the EPA WA COR to the contractor.

The contractor may be required by or allowed to perform additional configurations of the tractor- trailer combination as provided in written technical direction from the EPA WA COR.

For the purposes of this work assignment, the vehicles, trailers and tires used will not become government furnished property. The Contractor shall ensure appropriate disposition of the vehicles, trailers and tires after all testing is completed, including removal of all instrumentation and returning any vehicles and trailer used in this task to production configuration.

Following completion of this work assignment, the Contractor shall ensure appropriate disposition of aerodynamic trailer devices and test equipment considered government furnished property.

Task 1a. Heavy Duty Class 8 Sleeper Cab Tractor Truck

The contractor shall conduct testing under this work assignment on one long haul, Class 8, 2012 Volvo VNL780 High Roof Sleeper Cab tractor equipped with an aerodynamic package. The truck shall be equipped with an engine that meets the 0.20g/hphr of Nox. To maintain consistency, EPA prefers that vehicles with Cummins ISX engines be used. The Contractor shall ensure EPA WA COR approval of the proposed truck/engine combination.

Task 1b. Heavy Duty Class 8 Day Cab Tractor Truck

The contractor shall conduct testing under this work assignment on one Class 8, 2012 Navistar ProStar High Roof Day Cab tractor equipped with an aerodynamic package. The truck shall be equipped with an engine that meets the 0.20g/hphr of NOx. To maintain consistency, EPA prefers that vehicles with Cummins ISX engines be used. The Contractor shall ensure EPA WA COR approval of the proposed truck/engine combination.

Task 1c. 53' Dry Box Van Trailer

The contractor shall utilize the 2008-09 Wabash 53' Dry Box Van Trailer used for testing under WA #0-03, #1-03 and #2-03 of this contract, and currently in possession of Southwest Research Institute, to conduct testing under this work assignment. If the

contractor does not have access to this trailer, they shall notify the EPA WA COR and include the cost of acquiring this trailer in the work plan.

The trailer used for testing shall meet the requirements of 40 CFR 1037.501 (g)(1), with the exception that aerodynamic features are permitted. This includes the technical amendments made to this section after the rule that updated the specifications for the trailer rear axle measurement.[2]

Task 1d. Aerodynamic Trailer Devices

The contractor shall utilize the aerodynamic trailer devices used for testing under WA #0-03, #1-03 and #2-03 of this contract, and currently in possession of Southwest Research Institute, to conduct testing under this work assignment. Specifically, the Contractor shall utilize trailer skirt and aft device/boat tail, individually and in combination for testing under this work assignment. If the contractor does not have access to this equipment, they shall notify the EPA WA COR and include the cost of acquiring this equipment in the work plan.

Task 1e. On-Road Test Equipment

The contractor shall utilize the equipment used for testing under WA #0-03, #1-03 and #2-03 of this contract, and currently in possession of Southwest Research Institute, to conduct testing under this work assignment. If the contractor does not have access to this equipment, they shall notify the EPA WA COR and include the cost of acquiring this equipment in the work plan.

Task 1f. Reduced Scale Wind Tunnel Test Equipment

The contractor shall utilize detailed, in-house models of 1/8th (12.5%) scale Class 7/8 tractor-trailers, 53 foot dry box van trailers, and aerodynamic trailer devices (trailer skirts, aft device/Trailer Tail, and trailer front device/gap reducer); for testing in different combinations to evaluate tractor/trailer/device aerodynamics. All models of tractors, trailers and aerodynamic trailer devices used in performance of this work assignment shall not be considered government furnished property.

Task 2: On-Road, Evaluations of a Full-Size Class 7/8 Tractor-Trailer Combination with and without Aerodynamic Trailer Devices

The contractor shall conduct on-road evaluations by performing the Coastdown and Constant Speed, on one full-size, Class 7/8 Tractor-Trailer combination with and without aerodynamic trailer devices installed, individually and in combination, to quantify the aerodynamic drag change aerodynamic trailer devices. The Class 7/8 tractor, trailer and aerodynamic devices to be evaluated are provided under the subtasks below for each test procedure. Additional detail on test scenario/case set-up for each sub-task will be provided to the contractor by the EPA WA COR via written technical direction. The contractor shall furnish results of this task to the EPA WA COR as they become available. The contractor shall include a summary of all results from this task in the final report.

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[2] http://www.gpo.gov/fdsys/pkg/FR-2013-06-17/pdf/2013-11980.pdf; see #24 on page 36392, near bottom right (italics indicate modified language: "§ 1037.501 General testing and modeling provisions. * * * * * (g)* * * (1) * * * (iv) It includes dual 22.5 inch wheels, standard mudflaps, and standard landing gear. The centerline of the rear tandem axle must be 146 ± 4 inches from the rear of the trailer."

For all sub-tasks under this task, the contractor shall provide EPA with the raw data in CSV format for all valid and invalid runs. The files shall include:

- Vehicle speed
- Relative wind speed, measured by the onboard anemometer
- Relative wind angle, measured by the onboard anemometer
- Run number
- Run direction
- Validity of run
- Vehicle configuration (i.e. tractor-trailer configuration)
- Date and time
- Ambient weather conditions (wind speed, wind direction, temperature)
- GPS coordinates
- Road grade as a function of time
- Other information, comments or notes related to the test runs (e.g., test weight, tractor-trailer gap width, bogey position, kingpin setting)
- Photos of the tractor, trailer, aerodynamic device and relevant equipment for each tested configuration.

Additional testing details will be provided to the contractor by the EPA WA COR via written technical direction. Potential sources for the work under this task are available upon request.

Upon completion of all subtasks under this task, and once the test program is completed and all data has received QA/QC review and approval, the contractor shall remove all instrumentation and return the truck to production configuration.

Task 2a. Coastdown Testing

The work under this sub-task is identical to coastdown testing performed under work assignment (WA) #0-03 and #1-03 of this contract, with the exception that the Class 7/8 tractors used for testing are different as discussed above in Task 1 of this work assignment.

The contractor shall perform coastdown testing on a model year 2012 Volvo VNL780 and a 2012 Navistar ProStar High Roof Day Cab, both with a Wabash 53' box trailer and aerodynamic trailer devices in the following configurations:

1) 2012 Navistar ProStar High Roof Sleeper Cab with trailer skirt and aft device/boat tail.
2) 2012 Navistar ProStar High Roof Day Cab with baseline trailer;
3) 2012 Navistar ProStar High Roof Day Cab with trailer skirt;
4) 2012 Navistar ProStar High Roof Day Cab with trailer skirt and aft device/boat tail.
5) 2012 Volvo VNL780 High Roof Sleeper Cab with baseline trailer;
6) 2012 Volvo VNL780 High Roof Sleeper Cab with trailer skirt;
7) 2012 Volvo VNL780 High Roof Sleeper Cab with trailer skirt and aft device/boat tail.

The contractor shall use the coastdown procedure described in 40 CFR Part 1066.310 of Title 40, with the following exceptions and additions:

- The contractor shall conduct coastdown testing to provide ten valid runs in each direction. If ten valid runs cannot be completed synchronously, the contractor is allowed to perform seven, at a minimum, or more valid runs in each direction.
- The contractor shall coast each vehicle configuration down from 70 mph to 0 mph (stop).

- The contractor shall provide EPA with grade data along the location of track or road. If the grade is constant through the length of track or road over which the coastdowns are conducted, the contractor shall instead provide this constant value. If EPA determines this value is insufficient, then the contractor upon request from EPA shall provide EPA with the location-specific grade.
- The contractor shall collect relative wind speed data during coastdowns using an anemometer mounted on the trailer approximately 1- meter above the trailer roof, at the midpoint of the trailer width, and within in 0-2 meters of the front of the trailer. The anemometer shall be approved by EPA WA COR before use.
- The contractor shall make appropriate modifications to the baseline (compliant) trailer for the test configurations stated above.

Task 2b. Constant Speed Testing

The contractor shall use the same Class 7/8 tractor trucks and 53' foot dry box van trailer from Task 2a to conduct a constant speed test to determine truck aerodynamic drag coefficient and rolling resistance. The work under this sub-task is identical to constant speed testing performed under work assignment (WA) #2-03 of this contract, with the exception that the Class 7/8 tractors used for testing are different, as discussed above in Task 1 of this work assignment. Under this task, the Contractor shall conduct constant speed testing on the same configurations identified in Task 2a of this work assignment.

Additional constant speed testing configurations shall be performed by the contractor only after receipt of written technical direction from the EPA WA COR. Specifically, additional configurations tested may include the trailer with no aerodynamic devices (baseline) and the trailer equipped with both the trailer skirt and aft device/boat tail as identified in Task 2a of this work assignment.

The contractor shall use four High Resolution Truck Torque Wheel Transducers with approximate 5 lb-ft. resolution as discussed in Task 1e during testing of each of the trucks. In addition, the contractor shall use mechanical protection against high torque application (both acceleration and braking) telemetry, and associated wheel adapters, encoder, amplifier, and power supply.

The contractor shall use an in-line strain-gauged torque flange, which will be used to measure driveshaft torque during the testing each of the trucks (i.e., driveshaft torque sensor). The torque flange shall be an ANSI C12.20 0.5 class meter with a range of 0 to 5,000 Newton- meters (N-m). These torque meters take special adapters and cannot be connected directly to the drive shaft. A modified drive shaft shall be acquired for each truck to accommodate the torque meter. These drive shafts shall be dynamically balanced.

The contractor shall use the driveshaft torque sensor and wheel hub meters simultaneously to collect data at the drive shaft and the wheels for comparison. The driveshaft torque sensor shall be calibrated according to the procedure stated in 40 CFR §1065.310.

The contractor shall collect relative wind speed data during constant speed testing using an anemometer mounted on the trailer approximately 1 meter above the trailer roof, at the midpoint of the trailer width, and within 0-2 meters of the front of the trailer. The anemometer shall be the same as the anemometer used for coastdown testing or an alternative device may be used if approved by the EPA WA COR before use.

The contractor shall monitor the drivetrain/powertrain fluid temperatures (e.g., transmission fluid, differential fluid) during the testing via data parameters delivered over the tractor electronic control unit (ECU) or vehicle data bus.

The contractor shall provide the EPA WA COR with grade data along the location of track or road where testing is performed. If the grade is constant through the length of track or road over which the tests are conducted, the contractor may instead provide this constant value. If EPA WA COR determines this value is insufficient, then the contractor upon written technical direction from the EPA WA COR shall provide the location-specific grade.

The contractor shall warm-up the vehicle for 30min-1 hour at 65mph prior to each day's testing. Warm up is not required between model/configuration changes provided that: 1) they occur on the same day as the warm-up procedure (i.e., testing performed on the next day requires a warm-up procedure); 2) the track and tires are and remain dry during testing to reduce error introduced via rolling resistance and condensation (i.e., if testing is halted due to wet weather conditions, a sufficient amount of warm up should be performed to ensure that the track surface is dry); and 3) no instrument errors have occurred (i.e., if instrumentation fails during testing, a warm-up procedure must be performed following instrumentation repair/replacement).

The contractor shall perform the test on the coastdown road that has used for the previous tests on this truck. The contractor shall perform testing at the speeds and durations as follows while recording torque and engine power OBD information:

- 10 mph – 7.5 minutes in each direction
- 20 mph – 7.5 minutes in each direction
- 30 mph – 7.5 minutes in each direction
- 50 mph – 8-10 minutes in each direction
- 70 mph – Approx 11.25 mi or 9.6 minutes in each direction.

If necessary, the contractor may perform multiple passes, likely needed for 50 mph and 70 mph runs.

Task 3: Wind Tunnel Evaluation of 1/8th (12.5%) Scale Class 7/8 Tractor-Trailer Combinations with and without Aerodynamic Trailer Devices

The contractor shall conduct reduced-scale wind tunnel evaluation of 1/8th (12.5%) scale Class 7/8 Tractor-Trailer combination models with and without aerodynamic trailer devices installed, individually and in combination, to quantify the aerodynamic drag change from aerodynamic trailer devices using the test procedures and specifications described in 40 CFR Part 86.1037.521.

The contractor shall provide detailed models of 1/8th (12.5%) scale Class 7/8 Tractor-Trailers as follows: the four North American tractor OEMs (Navistar, PACCAR, Daimler, Volvo); at least three 53 foot dry box van trailer OEMs, and the following aerodynamic trailer devices; trailer skirts, aft device/Trailer Tail, and trailer front device/gap reducer. These models shall be utilized for testing in different combinations to evaluate tractor/trailer/device aerodynamics. Additional technical detail on test scenario/case set-up will be provided to the contractor by the EPA WA COR via written technical direction. The contractor shall furnish results of this task to the EPA WA COR as they become available and shall include a summary of all results from this task in the final report.

For this task, the contractor shall have access to a reduced scale wind tunnel facility meeting the requirements in 40 CFR Part 86.1037.521 to conduct wind tunnel testing; 1/8th scale models of OEM Class 7/8 tractors, 53 foot dry box van and other trailers, and aerodynamic trailer devices, either independently owned or via access through the OEMs; and capabilities and facilities to properly instrument and modify 1/8th scale models for testing. The wind tunnel facility shall have a

rolling/moving floor and boundary layer reduction devices and both shall be active during the testing in this task. In addition, the contractor shall have the ability to perform dual balance force isolation to identify the independent drag forces acting separately on the tractor and trailer, as well as the forces on the overall, combined tractor-trailer.

In addition, the contractor shall include, at a minimum, the following items in the technical report: the test process, all set-ups, test conditions including tunnel set-up, the measurement equipment and the mounting system, tractor and trailer model configuration, equipment, software used, data collection methods, descriptive photos of the baseline and all items tested with key setup elements, basic description of post processing methods and calculations, and discussion and analysis of any testing issues, if applicable. Upon written technical direction from the EPA WA COR, the contractor shall be required to perform additional discussion and/or analysis on other aspects of the testing performed under this work assignment.

If the contractor does not possess a facility or have access to this equipment, they shall notify the EPA WA COR and include the cost of acquiring this service and equipment in the work plan. Potential sources for the work under this task are available upon request. Any source considered or used shall also meet the requirements above.

Any reduced scale model tractors, trailers or components manufactured or acquired for the purpose of this work assignment will not become government property.

Task 4: Quantification of Greenhouse Gas Emissions Potential from Aerodynamic Trailer Devices on Class 7/8 Tractor-Trailer Combinations

The contractor shall input the data generated in Tasks 1, 2, and 3 into EPA's Greenhouse Gas Emissions Model (GEM) to quantify/estimate the GHG/CO2 improvement from adding aerodynamic trailer devices to Class 7/8 Tractor-Trailer combinations. The EPA GEM software is publicly available at http://www.epa.gov/otaq/climate/gem.htm#2-0-1.

The contractor shall coordinate with and direct any question to the EPA WA COR on the process for developing the GHG emissions benefits using GEM. The contractor shall include a summary of all results from this task in the final report, including a list of the input parameters used for the GEM runs.

Task 5: Cost Analysis of Aerodynamic Trailer Devices for Class 7/8 Tractor-Trailer Combinations

The contractor shall perform a cost analysis of aerodynamic trailer devices intended for Class 7/8 Tractor-Trailer combinations. The contractor shall limit the focus of the cost analysis to the specific devices (e.g., trailer skirt, aft device/boat tail, front device/gap reducer) tested under this work assignment. Additionally, upon receipt of written technical direction from the EPA WA COR, the contractor shall expand this cost analysis to include additional devices (e.g., vortex generators, underbelly treatments, wheel covers) or devices from other manufacturers than those used for this work assignment. The contractor shall provide a basis and source for all assumptions and information collected under this task. The contractor shall include a summary of all results from this task in the final report.

The contractor shall not begin performance under this task until written technical direction is received from the EPA WA COR.

Task 6: Cost-Benefit Analysis of Aerodynamic Trailer Devices for Class 7/8 Tractor- Trailer Combinations

The contractor shall use the measured/estimated aerodynamic benefits generated in Tasks 2a, 2b, and 3, the GHG benefits estimated in Task 4, and the costs in Task 5 to produce a range of

the cost benefits of Aerodynamic Trailer Devices for Class 7/8 Tractor-Trailer Combinations following performance of those tasks and QA/QC of the data generated from each task. If data has not been generated under a task, the contractor shall perform the cost-benefit analysis using data from the tasks that have been performed.

The contractor shall use the metric of grams of CO2 per ton-mile (g/CO2/ton-mile; used by EPA) to calculate all cost benefits and shall convert these values into gallons/1,000 ton-mile (gal/1,000 ton-mile; used by NHTSA) to be consistent with the metrics used previously for HD GHG Phase 1, and anticipated for use in HD GHG Phase 2. The contractor shall use assumptions, methods and processes consistent with those in HD GHG Phase 1 to perform the cost-benefit analysis performed under this task, to the extent feasible. The contractor shall include a summary of all results and a detailed description of the methodology, procedures, numerical values, rationale and any other assumptions used for this task in the final report.

The contractor shall not begin performance under this task until written technical direction is received from the EPA WA COR.

IV. DELIVERABLES

1. Kick-off Meeting

Within one week after the WA is issued, but prior to the contractor submitting a Work Plan, the contractor shall discuss this work assignment with the EPA WA COR to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Develop Quality Assurance Project Plan

The contractor shall submit a draft QAPP to the EPA WA COR within 15 days of Work Plan approval. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The EPA WA COR shall review and comment on the draft QAPP. The contractor shall incorporate recommended changes and suggestions received from the EPA WA COR and shall submit a final QAPP within 15 days after receipt of EPA comments. Guidance can be found at: QAPP for use of existing data: http://www.epa.gov/quality/qs-docs/found-data-qapp-rqts.pdf; Assessment Factors for relevance, applicability, utility of existing data: http://www.epa.gov/spc/pdfs/assess2.pdf; and EPA Requirements for QAPPs: http://www.epa.gov/quality/qs-docs/r5-final.pdf.

The final QAPP shall cover all aspects of this test program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein. The contractor shall notify the EPA WA COR immediately if they encounter any equipment failures that cannot be remedied, problems that may impact the quality or on-time receipt of deliverables, or unavailability of items required for this work assignment.

3. Regular Progress Reports

The contractor shall provide the EPA WA COR with regular status reports via telephone conference or email during the period of performance. The frequency of the progress report can be adjusted as weekly or bi-weekly depending on the progress of the program. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WA COR concerning the scope of the solution.

4. Technical Reports

The contractor shall provide the EPA WA COR with a brief Technical Report upon completion of each task. Depending on the complexity of the subject matter and as directed via written technical direction by the EPA WA COR, these reports shall be in the form of either a presentation or a formal written document. Written products shall be delivered in formats specified by the EPA WA COR (e.g., Word, Excel).

5. Data

The contractor shall provide the EPA WA COR with raw test data within 5 days of completion of the contractor's quality control review and approval for such data. The contractor shall provide to the EPA WA COR valid test data from a vehicle (per task) within 14 days of completion of the testing on the vehicle. All data shall be presented in Excel format.

6. Draft and Final Reports

The contractor shall provide to the EPA WA COR a Draft Final Report and data set summarizing the results of all tasks within 30 days of completion of the laboratory and modeling work contained in this work assignment. The contractor shall deliver the Final Report within 15 days of receipt of comments from the EPA WA COR. All reports and associated materials (e.g., data sets) shall be provided in formats specified by the EPA WA COR.

Schedule of Deliverables

Deliverable	Completion Date
Kick-off Meeting (as necessary based on direction from the EPA WA COR)	Within 1 week of receipt of work assignment
QAPP submission	Within 15 days of receipt of Work Plan approval
Final QAPP	Within 15 days of receiving EPA comments
Complete Tasks 1 ,2	Before September 30, 2014
Complete Task 3	Before August 31, 2014
Complete Tasks 4, 5, & 6	Before September 30, 2014
Draft Final Report	Within 30 days of completion of all tasks
Final Report	Within 15 days of receipt of EPA comments on Draft Final Report

NON-DISCLOSURE AGREEMENT
All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the contractor to any other source without specific approval by U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-05

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014	GHG Transportation Inventory D
	Base Option Period Number 2	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 7a

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Venu Ghanta (Signature) (Date)	Branch/Mail Code: Phone Number: 202-564-1374 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Venu Ghanta (Signature) (Date)	Branch/Mail Code: Phone Number: 202-564-1374 FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-05
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	GHG Transportation Inventory Development
Period of Performance:	October 1, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Venu Ghanta 202-564-1372 ghanta.venu@epa.gov
Alternate WAM:	Edmund Coe 202-564-8994 coe.edmund@epa.gov

BACKGROUND

The transportation sector is responsible for roughly 30 percent of greenhouse gas (GHG) emissions in the U.S., as well as the production of smog precursors, carbon monoxide (CO) and air toxics. Other impacts from transportation include noise and ecosystem disturbance. These effects are acknowledged through national legislation and other commitments, including:

- National Environmental Protection Act of 1969 (NEPA)
- Clean Air Act (CAA) Amendments of 1990
- Intermodal Surface Transportation Act of 1991 (ISTEA)
- Transportation Equity Act for the 21st Century (TEA-21)
- Climate Change Action Plan of 1993 (CCAP) and
- 1993 United Nations Framework Convention on Climate Change (UNFCCC).

EPA supports a range of analytic functions to demonstrate the environmental impacts of transportation. The U.S., with lead responsibility by EPA, is required the UNFCCC to report to the United Nations all U.S. emissions and sinks of GHGs. By mutual agreement with the Office of Atmospheric Programs (OAP), the Office of Transportation and Air Quality (OTAQ) has assumed responsibility for preparing estimates of GHG emissions for the transportation sector. Within OTAQ, the Transportation and Climate Division (TCD) manages this analysis. TCD also supports EPA programs by examining the intersection of transportation policy, travel demand, vehicle engine technologies and energy consumption. Finally, TCD assists OTAQ and EPA in providing data and analysis to address the information requests of Congress, the Executive Branch, and the public.

SCOPE

TCD's analytic work addresses the environmental impacts of transportation programs, policies and investments at all levels of government. This effort enhances the technical capacity of stakeholders in the fields of climate change analysis, air quality management, and transportation and urban planning.

TCD's analysis of transportation and climate change includes the development of an emissions inventory that identifies and quantifies the primary anthropogenic sources and sinks of U.S. GHG emissions (and corresponding baselines) from transportation sources. The GHG transportation inventory must contain: (1) a comprehensive and detailed methodology for estimating sources and sinks of anthropogenic GHG emissions at levels sufficiently detailed to support policy decisions; and (2) represent a common and consistent source of information enabling OTAQ to compare the relative contribution of different GHG emission sources to climate change. The ability to estimate emissions systematically and consistently is a prerequisite for evaluating the cost-effectiveness and feasibility of GHG mitigation strategies.

TCD also sponsors research examining transportation-related impacts on natural and human systems, with the objective of improving environmental analysis and informing policy development. This work includes the estimation of emission factors to quantify mobile-source GHG and criteria output, as well as policy-sensitive models to forecast travel demand and energy consumption. Model results may be used to evaluate climate-related policy scenarios and guide EPA programs (such as SmartWay). Associated data and analysis may also be used to assist decision-making outside the agency, including the development of federal legislation, and the environmental initiatives of state and local governments. This information is available to broaden the scope of environmental planning and assist with planning requirements.

Task 1: <u>GHG Inventory Development for the Transportation Sector Required under UNFCCC</u>
The contractor shall prepare the annual GHG emission inventory from the transportation sector for the Inventory of U.S. Greenhouse Gas Emissions and Sinks document. The inventory shall include estimates of carbon dioxide (CO_2), methane (CH_4), Nitrogen Dioxide (N_2O) and hydrofluorocarbons (HFC) emissions from all mobile sources, including highway vehicles, aircraft, rail, watercraft, and non-road mobile sources. The inventory shall also include emissions of the following criteria pollutants: CO, NO_x, VOCs, and sulfur dioxide (SO_2); estimates of these gases are to be obtained from the Office of Air Quality Planning and Standards (OAQPS).

This task also includes performance of Quality Assurance and Quality Control (QA/QC) and uncertainty analyses. The contractor shall build upon the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011* document, improving on the estimation, documentation and reporting on uncertainties associated with both annual emission estimates and emission trends for the transportation inventory.

The contractor shall report transportation GHG/sink data in accordance with: (a) the required schedule for the annual inventory report (Report) required under UNFCCC and (b) the same formats necessary to complete tasks for the Report as defined through written technical direction by the EPA Work Assignment Manager (WAM). Each submission of transportation-related data to Office of Atmospheric Programs (OAP) shall be first approved by the WAM. OAP and the WAM will provide the contractor written technical direction with the guidance regarding uncertainty analysis, QA/QC activities, and requirements for documentation, spreadsheet management, annexes, work breakdown structure (WBS), and report write-up.

The Contractor may also be requested to provide additional analysis, research, and/or reports that support continued improvement of the transportation greenhouse gas inventory. As specific

needs evolve within the period of performance, the WAM will provide written technical direction for each report prior to the contractor commencing with this work.

Task 2: Preparation of 2014 "Fast Facts" Document
In conjunction with preparation of the final report in Task 1, the contractor shall provide input to a summary report to be released publicly which summarizes emissions from the sources in the transportation sector. This summary report shall be prepared in a similar fashion to the 2013 "Fast Facts" document that was produced along with the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011*. The summary report shall convey the highlights from the current year's inventory in sufficient detail to be used by policymakers within the Office of Transportation and Air Quality, and shall also be able to be understood by the general public.

QUALITY ASSURANCE (QA) REQUIREMENTS
The contractor shall submit a written Quality Assurance (QA) Project Plan that describes the quality assurance procedures, quality control specifications, and other technical activities that must be implemented. Alternatively, the contactor may submit a Quality Assurance Supplement to their Quality Management Plan that includes all the required information for a QA Project Plan.

DOCUMENTATION
The Contractor shall fully substantiate and document all of its work. No work shall be duplicated. In order to avoid duplication of effort, the Contractor shall always investigate existing literature and consult with the EPA WAM or the EPA Project Officer about any information the agency may have or know about prior to undertaking any market research activities. Reports submitted by the Contractor that contain recommendations to EPA shall explain and rank policy or action alternatives, describe the procedure used to arrive at recommendations, summarize the substance of deliberations, report any dissenting views, list the sources used, and make clear the methods and considerations upon which the recommendations are based.

DELIVERABLES
Kick off Meeting: Within one week of receipt of the work assignment, the Contractor shall discuss the tasks in the performance work statement to ensure a common understanding of the requirements, expectations, and ultimate end products.

Weekly Progress Reports: The Contractor shall meet with the EPA WAM on a weekly basis via telephone conference or email communications. The purpose of these meetings shall be to indicate the progress achieved, technical issues encountered, solutions to those issues, and projected activity for the upcoming weeks.

Draft Report: The Contractor shall provide the EPA WAM with all the spreadsheets and draft written text required for the Transportation component of the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012* by the end of January 2014.

Final Report: The contractor shall provide final spreadsheets and final written text for the Transportation component of the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012* by the end of March 2014.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-06

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014	Inland Port Community Transpor
	Base Option Period Number 2	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Tasks 7a, 2, 3, 4, 5, 12

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 02/20/2014 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Richard Baldauf (Signature) (Date)	Branch/Mail Code: Phone Number: 919-541-4386 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-06
Issuing Office:	US Environmental Protection Agency (EPA) Office of Transportation and Air Quality (OTAQ)
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Inland Port Community Transportation Resilience Analysis in Mississippi-Tennessee-Arkansas

Work Assignment Contracting Officer Representative(WA COR):
Dr. Rich Baldauf
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Baldauf.richard@epa.gov

Alternate WA COR:
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I. BACKGROUND

More than 25,000 miles of the nation's inland waterways are transporting millions of tons of cargo every day. The inland waterway transportation system is used to transport approximately 20% of the nation's coal, 22% of U.S. petroleum, and more than 60% of the nation's farm exports. Because much of the cargo shipped by barge is used as raw materials for other industries, disruptions in barge transportation results in production disruptions and economic losses throughout the country.[1] The inland ports are anticipating a greater flow of goods through waterways once the Panama Canal expansion is complete in 2014 (believed to be from an increase of agricultural exports although there has not been a documented assessment).

The tri-city regional area of Memphis-West Memphis-DeSoto County is a transportation and logistics hub for the region. The City of Memphis has tremendous logistics and shipping reach and access through rail, air freight, roads, and river. West Memphis began its role as a trucking hub with the opening of parts of I-55 with major interstates traveling toward the Mississippi River. DeSoto County is home to I-95 truck terminals and houses rail systems that serve intermodal yards in Memphis or West Memphis.

The 2011-2013 flooding and drought cycles on the Mississippi River severely curtailed barge traffic, which had a significant economic impact on the barge services, shipping, and agricultural industries. Rerouting disrupted cargo without overwhelming an already congested highway and rail system presents a significant challenge.[2] The American Waterways Operators estimates that transporting goods via waterways costs $11/ton less

[1] www.mackblackwell.org/NTSCOE_Communicator_August_2011.pdf
[2] Ibid

than by rail or truck. The economic costs that come from shipping delays and lighter loads could eventually trickle down to consumers. Being a transportation and logistics hub also has contributed to the tri-cities being designated a "marginal" non attainment area for the 2008 Ozone National Ambient Air Quality Standards; Memphis has a history of non-attainment dating back to 2004.[3]

This project addresses research needs and assessment tool development for inland ports with multimodal transportation options, which are susceptible to more frequent emergency weather impacts. This work will also be applicable to coastal port communities facing similar challenges. Key elements include: (1) identifying public health impacts from shifting intermodal transportation contributing to air emissions that impact regional and local air quality (2) assessing the economic costs to communities of shifting freight transportation choices; and, (3) determining how port communities can be more resilient[4] in the face of multimodal transportation disruptions[5]. This project will be conducted for the port cities of Memphis, West Memphis, and the city of Hernando in DeSoto County.

Research with the communities in the tri-city port area will inform the development of an in-land port community resilience decision roadmap that helps prioritize inter-modal shipping, emissions, business efficiency, and community health needs. The assessment and tool development work that would be completed would be transferable to other inland and coastal working waterfront communities to help mitigate potential health, environmental, and economic impacts. The proposal addresses the following ORD SHCRP research areas: 1) Data and tools to support community decisions; 2) Forecasting and assessing ecological and community health; and, 3) Integrated solutions for sustainable outcomes in specific communities. In addition, the project provides the necessary translation between ORD sustainability research to direct application that provides environmental, social, and economic benefits to communities.

II. TASKS

The WA COR will review all deliverables in draft form and provide revisions and/or comments to the contractor. The contractor shall prepare the final deliverables incorporating the WA COR's comments.

Contractor personnel shall at all times identify themselves as Contractor employees and shall not present themselves as EPA employees. Furthermore, they shall not represent the views of the U.S. Government, EPA, or its employees. In addition, the Contractor shall not engage in inherently governmental activities, including but not limited to actual determination of EPA policy and preparation of documents on EPA letterhead.

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[3] http://www.bizjournals.com/memphis/news/2012/12/20/shelby-countys-non-attainment-epa.html?page=all

[4] The definition of community resilience is the sustained ability of a community to withstand and recover from adversity (e.g., economic stress, public health pandemics, man-made or natural disasters). Community resilience entails the ongoing and developing capacity of the community to account for its vulnerabilities and develop capabilities that aid that community in (1) preventing, withstanding, and mitigating a stress or stressors; (2) recovering in a way that restores the community to a state of self-sufficiency and at least the same level of economic, environmental and public health and social functioning; and (3) using knowledge from a past response to strengthen the community's ability to withstand future incidents.[4]
While there is general consensus on the definition of resilience, there is less clarity on the precise roadmap to assess existing communities' vulnerabilities, and therefore predict their response to the resilience-building process. In other words, we have limited understanding about the components that can be changed or the "levers" for action that enable communities to recover more quickly.

[5] NOAA has a Port Resilience tool, but it does not deal with the variability faced by in-land ports. http://www.csc.noaa.gov/port/

Task 1 – Recommend and evaluate models that assess community environmental, health, and economic needs during multi-modal transportation shifts at inland ports

The contractor shall work with the EPA WA COR to develop a list of models currently available to assess community environmental health and economic needs that involve shifts in multi-modal freight transit, especially relevant to inland ports. The models shall be capable of including the collection of existing data on transportation shifts during drought and floods on the Mississippi River. The contractor shall determine the temporal context for this type of analysis in the model (e.g., look at floods/droughts over last ten years or include more historical data). The primary transportation shifts would be from tugboats and barges to overland freight including loading dock equipment, trucks, and rail. Some existing data and resources that the contractor shall consider in the initial analysis include:

A. The University of Arkansas and Rutgers University--The prototype decision support system will integrate GIS technology and computer based freight movement models to identify what cargoes should be prioritized for offloading during disruptions and what infrastructure exhibits low resiliency in terms of modal capacity to respond to disasters.
B. NOAA Port Resilience tool—Coastal ports tool that does not have information on in-land ports, and specifically does not address the inter-modal variability effects on in-land port communities. The roadmap they have developed can inform the work conducted under this project and vice-versa.
C. RIT and University of Delaware---Developing GIFT, develop a GIS-based tool to evaluate the energy, emission, cost, and time-of-delivery attributes of intermodal freight transport.[6] Existing tools will include, but not be limited to, CPORT, CCAT, EnviroAtlas and the Green Communities Framework.

The EPA WA COR will arrange a kick-off call with contractor staff, EPA staff and other relevant organizations within 30 days of approval of the final workplan. Within 20 days of this call, the EPA WA COR will arrange up to 4 meetings (via teleconference, or webinar) with contractor staff and EPA team members to review existing data resources and discuss factors to be included in the analysis.

Task 2 – Assess air emissions and exposure pathway for sensitive populations in inland port cities

The contractor shall examine existing air emissions modeling data and tools and refine them as needed to evaluate relative risks to sensitive populations along heavily traveled transportation routes from the inland ports out through the tri-city area. The contractor shall evaluate and refine the models and tools based on estimated impacts from multi-modal transportation shifts from barge to overland freight options. These shifts shall be based on predictive weather data for floods and droughts for this regional area. The contractor shall consider the following tools (but not limited to)[7]:

A. Texas Transportation Institute—Domestic freight analysis on emissions data for the relative transportation modes.

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[6] GIFT – Geospatial Intermodal Freight Transportation, http://www.rit.edu/gccis/lecdm/gift2.php
[7] EPA 2009 Research—Infra-red sensing of fugitive emissions by petrochemical barges in the tri-city port area

B. The University of Arkansas and Rutgers University--The prototype decision support system will integrate GIS technology and computer based freight movement models to identify what cargoes should be prioritized for offloading during disruptions and what infrastructure exhibits low resiliency in terms of modal capacity to respond to disasters.
C. NOAA Port Resilience tool—Coastal ports tool that does not have information on in-land ports, and specifically does not address the inter-modal variability effects on in-land port communities. The roadmap they have developed can inform the work conducted under this project and vice-versa.
D. Rochester Institute of Technology and University of Delaware---Developing GIFT, develop a GIS-based tool to evaluate the energy, emission, cost, and time-of-delivery attributes of intermodal freight transport.
E. Region 4 RARE Project—port emissions data from Charleston can be modified and applied here to extrapolate truck emissions for the inland ports in the tri-city area.

Task 3 – Conduct an inland ports community needs assessment

The contractor shall work with the EPA WA COR and staff to set up and conduct a community needs assessment with at least one port community in the tri-city regional shipping area. With consultation and input from the contractor, the EPA WA COR will provide the contractor with the name of the appropriate community for this work and the appropriate stakeholders to engage in this effort. The community needs assessment shall include relevant stakeholders (e.g., shipping companies, elected officials, nonprofit groups, and community leaders etc.) that will identify the following:

(a) Existing challenges during times of drought/flooding related to health, economic, and community disruptions;
(b) Community priorities and future development plans related to multi-modal transportation; and
(c) Potential opportunities to help businesses and communities evaluate how to adapt to future changes more efficiently and minimize threats to public health and the environment.

During this needs assessment, the contractor shall share the data and information collected under Tasks 2 and 3. This task will be estimated to begin within 30 days of completion of Task 3, in which time the WA COR, via written technical direction, shall provide the contractor with a selection of the community and relevant stakeholders for the needs assessment. The WA COR and the contractor shall hold up to three conference calls with the identified community to complete the needs assessment. The WA COR will work with additional EPA staff and outside stakeholders to identify appropriate additional stakeholders to participate in the needs assessment. The contractor shall travel to the community and complete the needs assessment; travel that is not to last more than 3 days. In accordance with contract terms, the contractor shall seek approval from EPA Project Officer prior to any travel contemplated as a result of this task.

Task 4 – Formulate a potential roadmap for inland ports resiliency

The contractor shall prepare an analysis or potential roadmap for inland ports that looks at resilience to severe weather and climate change. The analysis shall take into account the community needs assessment and the public health, environmental, and economic effects of disruptions or increases to multi-modal freight transportation in inland

communities. The contractor shall identify existing tools and data that can inform the community resilience decision roadmap outline steps that port communities can take to be more resilient to changes in freight shipping modes and that utilize community input and other resources to be more efficient.

III. DELIVERABLES

1. Kick-off Meeting. Within one week after the WA is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WA COR to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WA COR within 2 weeks of Work Plan approval. The QAPP shall describe the quality control processes for secondary data projects and for research model development and application projects. The QAPP's format shall follow the requirements given in Attachment A to this Performance Work Statement. Work involving environmental data collection, generation, use, or reporting shall not start until the QAPP has been approved by the APPCD quality assurance staff. EPA will review and provide comments on the draft QAPP. A final QAPP shall be submitted within 15 business days of receipt of EPA comments.

3. Bi-Weekly Progress Reports. The contractor shall provide the EPA WA COR with brief weekly status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WA COR concerning the scope of the solution.

Schedule of Deliverables

Task	Activity	Schedule
Kick Off Meeting		Within 1 week of receipt of Work Assignment
Draft QAPP		Within 2 weeks of receipt of Work Plan approval
Final QAPP		Within 15 business days of receipt of EPA comments on draft QAPP
Task 1	Kick-off call with contractor, EPA WA COR and staff, and other identified organizations; EPA will organize and provide logistics for the call	20 working days after final workplan approved
	EPA will arrange up to 4 meetings (via teleconference, or webinar) with contractor and EPA staff to review existing data resources and discuss factors to be included in the Task 2 analysis.	15 working days after kick-off meeting
	The contractor shall complete and report on the preliminary list of models	20 working days after final meeting
	EPA will provide comments on draft list of models	15 working days after receipt of draft report

	The contractor shall submit the final report listing the model identified	10 working days after receipt of EPA comments
Task 2	Contractor shall develop a draft outline for assessing the existing modeling data and tools	15 working days after completion of Task 2
	EPA will provide comments on draft outline	15 working days after receipt of draft outline
	The contractor shall complete a preliminary model/tool refinement analysis	60 working days after receipt of EPA comments on draft outline
	EPA will provide comments on draft model/tool refinement analysis	15 working days after receipt of draft analysis
	The final model/tool refinement analysis shall be provided to the EPA	10 working days after receipt of EPA comments on draft analysis
Task 3	EPA will provide the contractor with a selection of the community and relevant stakeholders for the needs assessment	20 working days after completion of Task 3
	EPA will arrange up to three conference calls with the contractor and identified community participants to aid in the completion of the needs assessment	15 working days after completion of community selection
	The contractor shall travel to the community and complete the needs assessment that is not to last more than 3 days	30 working days after completion of community conference calls
	The contractor shall submit a draft of the needs assessment to the EPA WA COR	20 working days after completion of the needs assessment site visit
	EPA will provide comments on draft needs assessment report	15 working days after receipt of draft needs assessment summary
	The contractor shall submit a final needs assessment report to the EPA WA COR	15 working days after receipt of EPA comments on the needs assessment summary
Task 4	The contractor shall provide the EPA WA COR with a draft inland ports resilience roadmap	30 working days of completion of Task 4
	EPA will provide comments on draft inland ports resilience roadmap	15 working days after receipt of draft roadmap
	The contractor shall provide the EPA WA COR with a final inland ports resilience roadmap	15 working days after receipt of EPA comments on the draft roadmap

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by the U.S. EPA.

ATTACHMENT A
FOR SECONDARY DATA AND RESEARCH MODEL PROJECTS

NRMRL Quality Assurance (QA) Requirements

In accordance with EPA Order 5360.1 A2, conformance to ANSI/ASQC E4 must be demonstrated by submitting the quality documentation specified herein. All quality documentation shall be submitted to the Government for review. The Government will review and return the quality documentation, with comments, and indicate approval or disapproval. If the quality documentation is not approved, it must be revised to address all comments and shall be resubmitted to the Government for approval. Work involving environmental data collection, generation, use, or reporting shall not commence until the Government has approved the quality documentation. The quality documentation shall be submitted to the Government at least thirty (30) days prior to the beginning of any environmental data gathering or generation activity in order to allow sufficient time for review and revisions to be completed. After the Government has approved the quality documentation, the Contractor shall also implement it as written and approved by the Government. Any EPA-funded project/program may be subject to a QA audit.

TO BE SUBMITTED PRE-AWARD (mark all that apply):

□ **NRMRL's Quality System Specifications:**

(1) a description of the organization's Quality System (QS) and information regarding how this QS is documented, communicated and implemented;
(2) an organizational chart showing the position of the QA function;
(3) delineation of the authority and responsibilities of the QA function;
(4) the background and experience of the QA personnel who will be assigned to the project; and
(5) the organization's general approach for accomplishing the QA specifications in the SOW.

□ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001, http://www.epa.gov/quality/qs-docs/r2-final.pdf

TO BE SUBMITTED POST-AWARD (mark all that apply):

□ **NRMRL's Quality System Specifications:**

(1) a description of the organization's Quality System (QS) and information regarding how this QS is documented, communicated and implemented;
(2) an organizational chart showing the position of the QA function; 07/14/08 A-2
(3) delineation of the authority and responsibilities of the QA function;
(4) the background and experience of the QA personnel who will be assigned to the project; and
(5) the organization's general approach for accomplishing the QA specifications in the SOW.

□ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001, http://www.epa.gov/quality/qs-docs/r2-final.pdf

□ **Category I or II Quality Assurance Project Plan (QAPP):** prepared in accordance with R-5 - EPA Requirements for QA Project Plans (EPA/240/B-01/003) March, 2001 http://www.epa.gov/quality/qs-docs/r5-final.pdf

X Category III or IV QAPP: prepared in accordance with applicable sections of the following NRMRL QAPP Requirements List(s) which is(are) included in this attachment:

□ **QAPP Requirements for Measurement Projects**

X QAPP Requirements for Secondary Data Projects

X QAPP Requirements for Research Model Development and/or Application Projects

□ **QAPP Requirements for Software Development Projects**

□ **QAPP Requirements for Method Development Projects**

□ **QAPP Requirements for Design, Construction, and/or Operation of Environmental Technology Projects**

ADDITIONAL QA RESOURCES:

EPA's Quality System Website: http://www.epa.gov/quality/
EPA's Requirements and Guidance Documents:
http://www.epa.gov/quality/qa_docs.html

NRMRL QAPP REQUIREMENTS FOR SECONDARY DATA PROJECTS

GENERAL REQUIREMENTS

Include cover page, distribution list, approvals, and page numbers.

0. COVER PAGE

Include the Division/Branch, project title, revision number, EPA technical lead, QA category, organization responsible for QAPP preparation, and date.

1. PROJECT DESCRIPTION AND OBJECTIVES

1.1 Describe the process and/or environmental system to be evaluated.
1.2 State the purpose of the project and list specific project objective(s).

2. ORGANIZATION AND RESPONSIBILITIES

2.1 Identify all project personnel, including QA, and related responsibilities for each participating organization, as well as their relationship to other project participants.
2.2 Include a project schedule that includes key milestones.

3. SCIENTIFIC APPROACH

3.1 Identify the secondary data needed to meet the project objective(s). Specify requirements relating to the type of data, the age of data, geographical representation, temporal representation, and technological representation, as applicable.
3.2 Identify the source(s) for the secondary data. Discuss the rationale for selecting the source(s) identified. If a hierarchy of sources exists for the gathering of secondary data, specify that hierarchy.

4. QUALITY METRICS

4.1 Specify the quality requirements of the secondary data. These requirements must be appropriate for the intended use of the data. Address accuracy, precision, representativeness, completeness, and comparability, if applicable.
4.2 Describe the procedures for determining the quality of the secondary data.
4.3 If no project-specific data quality requirements exist, state this in the QAPP. If the quality of the secondary data will not be evaluated by EPA, require that a disclaimer be added to any project deliverable to indicate that the quality of the secondary data has not been evaluated by EPA for this specific application. Provide the wording for the disclaimer.

5. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

5.1 Identify the data reporting requirements, including data reduction procedures specific to the project and applicable calculations and equations.
5.2 Describe data validation procedures used to ensure the reporting of accurate project data.
5.3 Describe how the data will be summarized or analyzed (e.g., qualitative analysis, descriptive or inferential statistics) to meet the project objective(s).
5.3.1- If descriptive statistics are proposed, state what tables, plots, and/or statistics (e.g., mean, median, standard error, minimum and maximum values) will be used to summarize the data.
5.3.2- If an inferential method is proposed, indicate whether the method will be a hypothesis test, confidence interval, or confidence limit and describe how the method will be performed.
5.4 Describe data storage requirements for both hard copy and electronic data.

6. REPORTING

6.1 List and describe the deliverables expected from each project participant.
6.2 Specify the expected final product(s) that will be prepared for the project (e.g., journal article, final report, etc.). Specify the source(s) of the secondary data in any deliverable.

7. REFERENCES

Provide references either in the body of the text as footnotes or in a separate section.

NRMRL QAPP REQUIREMENTS FOR
RESEARCH MODEL DEVELOPMENT AND APPLICATION PROJECTS

GENERAL REQUIREMENTS:

Include cover page, distribution list, approvals, and page numbers.

0. COVER PAGE

Include the Division/Branch, project title, revision number, EPA technical lead, QA category, organization responsible for QAPP preparation, and date.

1. PROJECT DESCRIPTION AND OBJECTIVES (MODEL DEVELOPMENT AND MODEL APPLICATION)

In this document, "project" can mean (a) development or substantial modification of a model for application to address a general problem; (b) application of an existing model (including minor modification to the existing model) to address a specific problem; or (c) a development or substantial modification and application of a model to address a specific problem.

1.1 State the purpose of the project and list the project objective(s). Indicate whether a new model will be developed or an existing model will be used.
1.2 Describe the problem, the data to be generated by the model, how the data will be used to address the problem, and the intended users of the data. Describe the environmental system/setting to be modeled, where the model will be applied, and the circumstances and scenarios to be considered for the modeled system.

2. ORGANIZATION AND RESPONSIBILITIES (MODEL DEVELOPMENT AND MODEL APPLICATION)

2.1 Identify all project personnel, including QA, and related responsibilities for each participating organization, as well as their relationship to other project participants.
2.2 Include a project schedule that includes key milestones.

3. MODEL SELECTION (MODEL APPLICATION ONLY)

3.1 Discuss model selection with respect to how it will be used and how it is consistent with the project objectives. Include fundamental details such as whether the model will be used to predict the world beyond the model or in scenario analysis of the model itself. Describe the limits to where the model is applicable.
3.2 Provide a description of the model attributes/capabilities required for the project. This description should include hardware requirements and restrictions. Provide an overview of the candidate model attributes, including:
- model origin and its original purpose, if applicable
- model structure (e.g., stochastic vs. deterministic, structural framework)
- parameters and variables
- the algorithms and equations that have been developed to support the model theory, along with the sources of the algorithms
- spatial extent (individual, group, population)
- spatial resolution (location independent/dependent, dimensionality)
- temporal extent (length of modeling period)

- temporal resolution (time step)

3.3 Identify the model to be used or, if the model has not yet been selected, describe the process to be used for the selection of an existing model.
3.4 Identify specific requirements for application of the selected model for this specific purpose (e.g., current and appropriate data, parameter values, assumptions).

4. MODEL DESIGN (MODEL DEVELOPMENT ONLY)

4.1 Describe the conceptual model(s) for the system, including model parameters.
4.2 Identify algorithms and equations that have been developed to support the model theory, or if such equations are not already available, describe the process used to develop these equations.
4.3 Specify required sources for model databases and any requirements for these data (e.g., quality, quantity, spatial, and temporal applicability). If data sources are not currently known, describe the criteria used to identify sources. Describe how any data gaps will be filled.

5. MODEL CODING (MODEL DEVELOPMENT ONLY)

5.1 Discuss the requirements for model code development, where applicable.
5.2 Identify computer hardware and software requirements.
5.3 Discuss requirements for code verification.

6. MODEL CALIBRATION (MODEL DEVELOPMENT AND MODEL APPLICATION)

Calibration is the process of adjusting model parameters within physically defensible ranges until the resulting predictions give the best possible or desired degree of fit to the observed data. Calibration should be applied each time the model is modified.

6.1 Discuss how the model will be calibrated.
6.2 Identify the type and source of data (e.g., new data, existing data, professional judgment, expert opinion elicitation) that will be used to calibrate the model, including any requirements for the data (quality, quantity, and spatial and temporal applicability). If data sources are not currently known, describe the criteria used to identify sources.
6.3 Specify acceptance criteria which need to be met for the difference between predicted and observed data during model calibration, where applicable. The statistical methods (e.g., goodness-of-fit, regression analyses) or expert judgment to be used should also be discussed.

7. MODEL VERIFICATION (MODEL DEVELOPMENT AND MODEL APPLICATION)

Verification consists of comparing the predictions of a calibrated model with available data that were not used in the model development and calibration.

7.1 Discuss the approach to be used for model verification. Describe how the verification is appropriate based on the model's purpose. Identify the type and source of data (e.g., new data, existing data, synthetic test data sets, professional judgment, expert opinion elicitation) that will be used to verify the model. If data sources are not currently known, describe the criteria used to identify sources.
7.2 Discuss the characterization of model uncertainty (model framework, model input, and model applicability) and sensitivity (model application only).

7.3 Describe any requirements (quality, quantity, and spatial and temporal applicability) for the data that will be used to verify the model.
7.4 Describe the approach used to determine if the independent data verify the model predictions. Specify the criteria which need to be met for the difference between predicted and observed data for the model to be considered to be verified. Discuss any statistical methods to be used (e.g., goodness-of-fit, regression analyses).

8. MODEL EVALUATION (MODEL DEVELOPMENT AND MODEL APPLICATION)

8.1 List and describe the qualitative or quantitative assessment process to be used to generate information to determine whether a model and its analytical results are of a quality sufficient for the intended use.
8.2 List and describe any independent/external evaluation and review of the model and model design, such as scientific peer review.

9. MODEL DOCUMENTATION (MODEL DEVELOPMENT AND MODEL APPLICATION)

Specify the requirements for model documentation. Good documentation includes:

- final model description, final model specifications (model development only), hardware and software requirements, including programming language, model portability, memory requirements, required hardware/software for application, data standards for information storage and retrieval
- the equations on which the model is based (model development only)
- the underlying assumptions
- flow charts (model development only)
- description of routines (model development only)
- data base description
- source code (model development only)
- error messages (model development only)
- parameter values and sources
- restrictions on model application, including assumptions, parameter values and sources, boundary and initial conditions, validation/calibration of the model, output and interpretation of model runs (model development only)
- the boundary conditions used in the model
- limiting conditions on model applications, detail where the model is or is not suited
- changes and verification of changes made in code
- actual input data (type and format) used
- overview of the immediate (non-manipulated or -post processed) results of the model runs (model application only)
- output of model runs and interpretation
- user's guide (electronic or paper)
- instructions for preparing data files (model development only)
- example problems complete with input and output
- programmer's instructions
- computer operator's instructions
- a report of the model calibration, validation, and evaluation (model development only)
- documentation of significant changes to the model
- procedures for maintenance and user support, if applicable

10. REPORTING (MODEL DEVELOPMENT AND MODEL APPLICATION)

10.1 List and describe the deliverables expected from each project participant.
10.2 Specify the expected final product(s) that will be prepared for the project (e.g., journal article, final report).

11. REFERENCES

Provide the references either in the body of the text as footnotes or in a separate section.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-07

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014	Peer Review of March 2013 LDV
	Base Option Period Number 2	

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 11

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Jeff Cherry (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4371 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-07
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Peer Review of March 2013 LDV Rebound Report by Small and Hymel
Period of Performance:	October 1, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Jeff Cherry 734-214-4371 cherry.jeff@epa.gov
Alternate WAM:	Anthony Neam 734-214-4201 neam.anthony@epa.gov

BACKGROUND

The Office of Transportation and Air Quality (OTAQ) of the U.S. Environmental Protection Agency (EPA) is responsible for developing regulations to reduce the emissions of greenhouse gases (GHG) from light-duty vehicles in the U.S. The regulatory option of encouraging the adoption of advanced technologies for improving vehicle efficiency can result in significant fuel savings and GHG emissions benefits. At the same time, it is possible that some of these benefits might be offset by additional driving that is encouraged by the reduced costs of operating more efficient vehicles. This so called "rebound effect", the increased driving that results from an improvement in the energy efficiency of a vehicle, must be determined in order to reliably estimate the overall benefits of GHG regulations for light-duty vehicles.

Dr. Ken Small, an Economist at the Department of Economics, University of California at Irvine, with contributions by Dr. Kent Hymel, Department of Economics, California State University at Northridge, have developed a methodology to estimate the rebound effect for light-duty vehicles

in the U.S. Specifically, rebound is estimated as the change in vehicle miles traveled (VMT) with respect to the change in per mile fuel costs that can occur, for example, when vehicle operating efficiency is improved. The model analyzes aggregate personal motor-vehicle travel within a simultaneous model of aggregate VMT, fleet size, fuel efficiency, and congestion formation. The model uses three-stage least squares (3SLS) in order to account for the endogeneity of explanatory variables. The results contain both short-run and long-run estimates based upon lagged effects within annual data. For VMT, the behavioral responses underlying short run effects could include changes in travel mode, discretionary trips, destinations, or the combining of several trips into a single chain. Long-run responses might include changes in the vehicle stock, job or residential relocations, and changes in land use.

The model is estimated using a cross-sectional, time series data set with each variable measured for 50 U.S. states, plus District of Columbia, annually for years 1966-2009. Variables are constructed from public sources, mainly the U.S. Federal Highway Administration, U.S. Census Bureau, and U.S. Energy Information Administration.

Since the effectiveness of regulatory efforts to reduce GHG emissions is strongly influenced not only by the technical attributes of vehicles, but also by vehicle usage levels, it is important to assure that the methodologies considered by the U.S. EPA for estimating VMT rebound have been thoroughly examined. Comprehensive, objective peer reviews like the one initiated here are an important part of that examination process.

CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this work assignment are consistent with the work authorized in Section 11 of the contract's statement of work.

The report under peer review shall be treated as confidential information for the course of the review and the materials are to stay within the knowledge of the contractor, peer reviewers and EPA staff. Authorization should be sought through the EPA Project Officer (PO) or Work Assignment Manager (WAM) to discuss the material outside of the context of the peer review(s).

SCOPE/ OBJECTIVES

EPA's peer review guidelines specify that all highly significant scientific and technical work products shall undergo independent peer review per specific agency protocols. To assure the use of the highest quality science in its predictive assessments, the contractor shall conduct an independent peer review of each of these products. By so doing, EPA seeks to assure its stakeholders that each analysis/study has been conducted in a rigorous, appropriate, and defensible way.

The contractor shall identify three individuals from a pool of independent subject matter experts to review the report "The Rebound Effect from Fuel Efficiency Standards: Measurement and Projection to 2035", by Dr. Ken Small with contributions from Dr. Kent Hymel. The contractor shall facilitate each peer reviewer's review and comment.

TASKS

The Contractor shall be familiar with the provisions of the Peer Review Handbook to ensure that EPA's peer review guidelines are met. These guidelines, EPA's Science Policy Council Peer Review Handbook, 3rd Ed., can be found at http://www.epa.gov/peerreview/ . Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

A description of the work to be performed by the contractor in this Statement of Work follows.

Work Plan

The contractor shall prepare a work plan in accordance with the terms and conditions of the subject contract. The Workplan shall describe the steps that will be taken by the Contractor to provide for peer review, including selection of peer review candidates with appropriate expertise, determining absence of conflict of interest for the reviewers, document and reference distribution, establishing schedules, preparing the Peer Review Report and submittal of the Peer Review Package. It shall include an estimate of hours broken down by task and skill level and a detailed cost estimate. The contractor shall identify whether any potential conflict of interest exists for any part of this work assignment.

Task 1. Selecting Reviewer Candidates

The contractor shall develop a list of qualified subject matter experts from which to choose three candidate peer reviewers. This list can be independently generated by the Contractor, and/or other methods that independently identify experts in the field of estimating VMT light-duty vehicle rebound effects.

The Contractor shall submit a list that includes the names and affiliations of the selected peer reviewers, each peer reviewer's curriculum vitae or resume and a target start date for each person's peer review to the U.S. EPA WAM. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest. The Agency will review the proposed candidates for consistency with the requirements of the Work Assignment, based on conflicts of interest or past direct involvement with the work under review. The EPA WAM may disagree

with the contractor's choice of a peer reviewer candidate. However, EPA shall refrain from suggesting individuals to replace such candidates. In such a case, the contractor shall identify an alternate from the pool of acceptable peer review candidates and forward details of that candidate to the EPA WAM. Acknowledgement of the peer reviewer candidates proposed will be provided by the EPA WAM in writing, via written technical direction. The contractor shall not commence peer review work until such acknowledgement is received. To make the review process as credible as possible, the contractor shall **not** consult the EPA WAM in the determination of the final selection of peer reviewers.

Each of the potential peer reviewers must be independent. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective. (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook). In selecting reviewer candidates, the Contractor shall avoid those with actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest.

The contractor shall assume, for the purpose of estimating costs, that the documentation to review consists of between 60 to 100 pages of material. It is anticipated that each peer reviewer will spend approximately 25 hours in analysis of the data, assumptions and conclusions, and in writing comments.

A list of known subject matter experts from academia and industry (see following - Appendix "A") has been included as a suggested starting point from which to identify reviewers. The list shall not limit the contractor in the identification of potential reviewers. The contractor shall contact subject matter experts and determine whether each is able to perform the work during the period of performance. At all times, the contractor's personnel shall identify themselves as contractor employees and shall not represent themselves as EPA employees.

Task 2. Facilitation of Peer Review

The EPA WAM will forward on to the contractor all the material for the review.

The contractor shall begin the actual peer review process by distributing a charge letter (EPA WAM will provide a list of suggested charge elements/directed questions in Appendix "B") and all relevant documents to the peer reviewers. In the charge to the reviewers, an overall catch-all question shall be included at section end of any prescribed questions in order to capture other comments by the reviewers that were not outlined in the charge. The contractor shall assume that the peer review materials will be electronic and may be distributed by e-mail or FTP site.

Shortly after distributing the charge letter and supporting materials for the review product, the contractor shall arrange a teleconference between those peer reviewers it has identified in Task 1 above, the EPA WAM, EPA-identified relevant project-related staff and contractor staff to clarify any questions the peer reviewer(s) may have regarding the report/written materials. EPA may provide written technical direction and/or background information for the report under review.

Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through the EPA WAM. Any answers shall, in turn, be shared with the full group of reviewers. It is not necessary, however, that the peer reviewers jointly reach consensus on their findings and recommendations since there may be limited overlap in the peer reviewers' areas of expertise and the charge questions on which a reviewer may choose to focus.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the analysis or model by deadlines set forth in the deliverables schedule below. At the conclusion of the peer review initiated under this work assignment, the contractor shall gather all review comments to create a draft report of the conduct of the peer review. The contractor shall submit this draft report to the EPA WAM for review and comment. After a brief comment period, EPA will return the draft report to the contractor to create a final version of the report. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that the on-going peer reviews conform to EPA peer review policy.

Task 3. Documentation of Peer Review Process

The contractor shall provide EPA WAM with a summary report detailing the means by which reviewers were chosen, the manner in which the review process was administered, and how the peer review was brought to a close. This report shall be included as part of the Final Technical Report detailed in Task 4. This document is in addition to copies of the reviewers' peer review reports and other supporting documentation, as detailed above.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization, if applicable, and a statement of any real or perceived conflict(s) of interest. The contractor shall forward these documents on to the EPA WAM in electronic format along with any summary as detailed in Task 4 deliverables.

Task 4: Draft and Final Technical Report for Each Product Reviewed

The contractor shall develop both a draft and a final version of a technical report which details the work completed, including discussion of any issues encountered. The contractor shall prepare an introduction with a clear and concise overview of the comments made by the peer

reviewers. The draft final report shall include a written summary of all comments. The unedited reviewer comments shall also be submitted in the report along with the resumes/CVs and a signed Conflict of Interest statement from each reviewer. EPA will review each draft report and submit comments to the contractor.

The contractor shall provide EPA WAM with the final technical report, addressing EPA comments, within one week of receiving comments on the draft copy. The report shall be sent electronically in both Microsoft Word (*.doc or *.docx) and Adobe portable document file (*.pdf) formats.

PROJECT STATUS/REPORTING

Weekly Updates: The contractor shall be available for a weekly meeting by teleconference between EPA WAM and contractor staff, if needed, to discuss any on-going issue(s) which may arise in the course of the peer review effort.

Teleconference calls: The Contractor shall provide status updates through phone teleconferences for the EPA WAM or his designated alternate on a bi-weekly basis to summarize the progress made to date. The contractor shall indicate progress achieved in the preceding period, technical issues encountered, solutions to issues (proposed or attempted), and project activity for the next two week period. This report shall include any potential issues or circumstances that arise causing delays in the review process. The contractor shall also report if the project is beginning to exceed the hours or dollars agreed upon in the work plan. The contractor shall initiate additional contact with the EPA WAM, as needed, to resolve questions and discuss any technical issues encountered.

Monthly Status Report: The contractor shall provide a written status report with the monthly invoice sent to EPA's Contracting Officer. The monthly status reports shall track the progress made on each of the tasks/deliverables for each of the products being reviewed. The report shall summarize hours and dollars expended, as well as projections to complete work, on each of the tasks as detailed in the SOW. The report shall include information such as task and subtask names, hours spent, contact information, task start date and deadlines, deliverables, accomplishments, any technical issues encountered, work on-hold status and whether the project is on schedule.

This report shall also include any potential issues or circumstances that may arise causing any delays in the review process. The EPA PO and WAM will notify the contractor in writing regarding any changes to the report format.

DELIVERABLES SCHEDULE

The contractor shall complete deliverables in accordance with the proposed schedule below.

Milestone/Deliverable by Task	**Proposed Due Date****
Work Plan Preparation	• Deliver to EPA for approval, in keeping with IAW clauses
Task 1: Reviewer Selection • Peer reviewer selections for each panel • Begin contacting prospective panel members to finalize participation of members on each panel • Receive resumes; forward peer reviewer qualifications to EPA	• Two weeks after work plan approval
Task 2: Facilitation of Peer Review • Charge letter and documents to reviewers • "Kick-off" teleconference • Peer reviewer's comments due to contractor	• Six weeks after work plan approval
Task 3: Documentation of Process • Draft report on documentation of process	• Nine weeks after work plan approval
Task 4: Draft and Final Technical Reports • Draft technical report • Final technical report	• 11 weeks after work plan approval • 13 weeks after work plan approval

** These dates are subject to negotiation and change as a result of EPA's regulatory schedule, availability of the final Peer Review Charge and review documents, or other factors outside of the WAM's control.

Appendix A:

List of Potential Subject Matter Experts/Reviewers*

The contractor may use the following list of subject matter experts as a "jumping–off" point from which to assemble each group of candidate peer reviewers. The contractor may pursue individuals identified through the contractor's own resources or query EPA's WAM for additional suggested reviewers, as needed. A subject matter expert is considered for the purposes of this peer review to be an individual that has 1) an advanced degree or equivalent experience in a physical, social, or applied science (e.g. economics, energy or transportation policy, engineering, psychology), 2) expertise in econometric methods, and 3) familiarity with some of the previous literature on rebound in the energy or transportation fields.

* Note: the following list is not comprehensive.

David Greene
Center for Transportation Analysis
National Transportation Research Center
2360 Cherahala Blvd.
Knoxville, TN 37932
(865) 946-1310
greenedl@ornl.gov

Kenneth Gillingham
Assistant Professor of Economics
Yale University
School of Forestry & Environmental Studies
Department of Economics
School of Management
195 Prospect Street
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(203) 436-5465
kenneth.gillingham@yale.edu

Joshua Linn
Tenured Fellow
Resources for the Future
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Jonathan Rubin
Professor of Economics
University of Maine
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Orono, Maine 04469
(207) 581-1528
rubinj@maine.edu

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Assistant Professor
University of California, Davis
Department of Economics
One Shields Ave
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Tel: (530) 752-5368
dsrapson@ucdavis.edu

Lucas Davis
Associate Professor
University of California, Berkeley
Haas School of Business
Berkeley, CA 94720
(510) 642-1651
ldavis@haas.berkeley.edu

Chris Knittel (MIT)
William Barton Rogers Professor of Energy Economics
Massachusetts Institute of Technology
Sloan School of Management
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Mark Jacobson (UC San Diego)
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Assistant Professor
University of Chicago
The Harris School of Public Policy Studies
1155 E. 60th St.
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Soren T. Anderson
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Department of Economics
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(517) 355-0286
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St. Paul, MN 55105
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Appendix B:

Elements to be Addressed in the Charge to the Peer Reviewers

The peer reviewers shall provide comments on the overall quality of the material presented in the report, including the assumptions made, the methodologies employed, and the conclusions. In addition to the overall comments, the reviewers shall address each of the specific elements listed below.

In their comments, reviewers should distinguish between recommendations for clearly defined improvements that can be readily made based on data or literature reasonably available to EPA and improvements that are more exploratory or dependent on information not readily available to EPA. Any comment should be sufficiently clear and detailed to allow a thorough understanding by EPA or other parties familiar with the analysis or the underlying data. Further, each peer review should address whether appropriate conclusions and implications can be drawn from either or both the study and any subsequent model predictions.

If a reviewer has questions about what is required in order to complete this review or needs additional background material, please direct the reviewer to contact the contractor's project manager for this effort. If a reviewer has a question about the EPA peer review process itself, please have the reviewer contact Ms. Ruth Schenk in EPA's Quality Office, National Vehicle and Fuel Emissions Laboratory by phone (734-214-4017) or through e-mail at schenk.ruth@epa.gov .

EPA requests that the reviewers not release the peer review materials or their comments to anyone else until the Agency makes its report and supporting documentation public.

Element 1:

What are the merits and limitations of Small's approach for estimating the vehicle miles traveled (VMT) rebound effect for light-duty vehicles? Are key assumptions underpinning the methodology reasonable? The VMT rebound effect is defined here as the change in VMT resulting from an improvement in light-duty vehicle efficiency.

Element 2:

Is the implementation of the Small methodology appropriate for producing estimates of the VMT rebound effect? Specifically, are the input data and the methodology used to prepare the data appropriate? Are sound econometric procedures used? Does the model appropriately reflect underlying uncertainties associated with the assumptions invoked and the parameters derived in the model?

Element 3:

The methodology used in this report attempts to account for asymmetric responses to increases vs. decreases in per mile fuel costs (and fuel prices). Does the report's finding of an asymmetric response seem reasonable given the methodology that Small employed? In particular, do the authors' preferred model specifications (3.21b and 4.21b) seem appropriate for capturing driver response to an increase in fuel efficiency?

Element 4:

The report describes a methodology for projecting the VMT rebound effect for light-duty vehicles forward in time. The concept of dynamic rebound is introduced to quantify the rebound effect over the period of a vehicle lifetime, during which time the variables that influence the rebound effect are changing. Is this methodology reasonable and appropriate, given the inherent uncertainty in making projections about how future drivers will respond to a change in the fuel efficiency of their vehicles?

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-09

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Cost Reduction through Learnin

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Tasks 2b and 2i

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Contract Period:	Cost/Fee:	LOE:
	02/01/2012 To 09/30/2014		
This Action:			
Total:			

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee:	LOE:
Cumulative Approved:	Cost/Fee:	LOE:

Work Assignment Manager Name: Anthony Neam (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4201 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-09
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Cost Reduction through Learning in Manufacturing Industries and in the Manufacture of Mobile Sources
Period of Performance:	October 1, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Anthony Neam 734-214-4201 neam.anthony@epa.gov
Alternate WAM:	Gloria Helfand 734-214-4688 helfand.gloria@epa.gov

Background

Since the late 1990s, EPA's Office of Transportation and Air Quality (OTAQ) has included a learning effect when estimating the costs of regulatory packages. Specifically, technology costs—for technologies added to mobile sources to allow for compliance with new emissions standards—are estimated to decrease in the years following first implementation. This decrease in technology costs, either due to the volume of production or to time, is considered to be due to learning. Learning may reflect efficiencies gained in production processes, in the design of the manufactured components, or some combination of each. These may result from phenomena such as learning by doing, technological innovation, or other mechanisms.

This learning effect has been studied by academia and industry for more than 60 years. Many studies are available that examine the learning effect, or aspects of it; the vast majority of these studies conclude that cost reductions through learning do, in fact, occur. Other studies assume

that cost reductions will occur based on the body of evidence suggesting that they do and incorporate learning effects into their analysis, as EPA does in its cost analyses.

While there is little doubt that this learning effect occurs, the learning estimates used by OTAQ in its cost analyses are based on somewhat dated studies that are not specific to the mobile source sector(s). Therefore, the goal of this work assignment is to develop a single compendium study on industrial learning in the mobile source sector(s) that can be relied on as the basis for this effect in future cost analyses.

Scope

This work assignment shall consist of a literature review of studies of learning in mobile source industries, most notably the automotive industry (both original equipment manufacturers and tier 1 suppliers), and it shall identify and summarize empirical estimates of learning from those studies. It shall use existing research on learning in general manufacturing to provide background and context for this literature review. In addition to studies of learning for the light-duty vehicle sector and automotive parts suppliers, the contractor shall identify studies of learning in other on-road mobile source sectors, such as manufacturing of loose engines (those built for installation in large highway trucks and/or nonroad equipment), manufacturing of large vocational/line-haul trucks and manufacturing of large nonroad equipment. This work shall provide a definitive, reliable, single source of information demonstrating the occurrence of learning in the mobile source industry(ies). It shall also summarize empirical estimates of the learning effect separately for each of the specific mobile source sectors (e.g., original equipment auto makers, parts suppliers to those auto makers, loose engine manufacturers, large truck manufacturers, and nonroad equipment manufacturers) for which studies are found that address those specific sectors.

Task 1 – Identify an Appropriate Advisor to Assist in Literature Searches and Determining the Quality of Studies Found

EPA seeks to have an assessment of learning that meets high standards of credibility. To assist in achieving this high standard, the contractor shall identify an independent subject matter expert to act as a subject matter advisor for this work assignment. The subject matter expert shall have expertise in the phenomenon of learning in manufacturing, as demonstrated by authorship of high-quality academic publications on learning in manufacturing; it is desirable that the expert also have expertise in learning specifically in the automotive or mobile source sector(s). The expert shall have the appropriate background and knowledge to provide advice with respect to the literature search and summary of learning effects, both in manufacturing in general and for the mobile source sector, called for in Tasks 2, 3, and 4.

Within 6 business days of receipt of EPA approval of its work plan, the Contractor shall provide the Work Assignment Contracting Officer's Representative (WA COR) with a memorandum (or

email communication) identifying the selected advisor, his/her affiliations, and copies of his/her resume. The Contractor shall also provide a detailed plan of expected hours for the advisor.

Task 2 – Conduct a Literature Review of Studies Conducted Concerning the Learning Effect in Mobile Source Manufacturing Industries

In consultation with the subject matter advisor identified in Task 1, the Contractor shall identify a maximum of 10 studies of learning in general manufacturing. The purpose of these studies is to provide a context and source of comparison for the information found in the studies of learning in the mobile source sector. These studies shall reflect the best available information on what is known of learning in manufacturing, including but not limited to discussions of the different forms of learning that have been studied (including but not limited to: learning-by-doing, technological change, increasing productivity, achieving economies of scale, and other effects identified in the studies) and empirical estimates of learning in general and of each of those forms of learning. The Contractor shall use the list of sources of learning in general manufacturing to ensure that s/he has identified all relevant forms of learning in the mobile source sector. The Contractor shall use the empirical estimates of learning in general manufacturing for comparison with the mobile source sector and, if appropriate, to provide some insights into learning, and possibly contribute to quantitative estimates, in areas where studies in the mobile source sector appear not to exist.

The Contractor shall assemble a list of scholarly articles, books, and other sources relevant to research and studies on learning effects in mobile source manufacturing industries (e.g., original equipment auto makers, parts suppliers to those auto makers, loose engine manufacturers, large truck manufacturers, and nonroad equipment manufacturers). To create this list, the Contractor shall consult specialized and general economic and academic databases, internet searches, and such other sources that will yield reliable overview of the significant research performed in this field.

The Contractor, with the assistance of the subject matter advisor, shall identify from the list in Subtask 2b the most relevant studies of learning in the mobile source sector (e.g., original equipment auto makers, parts suppliers to those auto makers, loose engine manufacturers, large truck manufacturers, and nonroad equipment manufacturers). The list shall have no limit and shall be comprehensive of all studies deemed to be academically credible.

Within 4 weeks of receipt of EPA approval of its work plan, the Contractor shall submit to the EPA WA COR for review and approval the lists of all studies (both those from Subtask 2a and those from Subtask 2b) and those deemed most relevant (Subtask 2c). EPA will review and provide comments within 2 to 4 weeks of receipt of the interim report.

Task 3 – Summarize Research Conducted, Results and Conclusions of those Studies Deemed to be the Most Relevant

The Contractor shall provide a summary of each of the studies contained on the list of most relevant studies described in Subtasks 2a and 2c, as described herein. For these most relevant studies, the contractor shall provide information on:

- Citation
- Specific industry examined
- Type of learning effect examined; research question
- Description of data set used
- Description of methodology used
- Conclusions, including any quantitative estimates of learning effects
- Assessment of the study
    - Are the conclusions supported by the data analysis, historical material, case studies, statistics, etc.
    - Strengths/weaknesses

In performing the summaries, the contractor shall comment, in each category of general manufacturing and the mobile source sector, on whether the studies show a general agreement about the existence of learning in general and the different forms of learning that have been studied (including but not limited to: learning-by-doing, technological change, increasing productivity, achieving economies of scale, and other effects identified in the studies), and the range of values for empirical estimates of learning in general and the different forms of learning.

For studies identified in Subtask 2b but not included in Subtask 2c, the contractor shall provide a citation (authors, date, publication data). In addition, the Contractor shall categorize the studies by whether they are quantitative or qualitative research, and the specific sector being studied. The Contractor shall also categorize the studies by the aspect of learning being examined, using the categories identified in the review of learning in general manufacturing, including but not limited to: learning-by-doing, technological change, increasing productivity, achieving economies of scale, and such other effects identified in the studies. The Contractor shall specify whether the focus of the analysis is changes in costs as cumulative output increases, changes in

costs over time, or other metrics identified in the studies. The contractor shall input these results into a summary table.

Within 4 weeks of EPA's approval of the Interim Report described in Subtask 2d, the Contractor shall submit a report containing the summaries described in Subtask 3a to the EPA WA COR. EPA will review and provide comments on this interim report within 2 to 4 weeks of receipt of this interim report.

Task 4 – Synthesis of Mobile Source Learning Literature

Using the information gathered in Tasks 2 and 3, the Contractor, with the assistance of the subject matter advisor, shall synthesize the body of literature pertaining to mobile source industries. This analysis shall include a description of the types of learning associated with these sectors and the magnitude of the estimated combined effects of learning on production costs. The discussion shall identify estimates of learning separately for the original equipment automotive industry, the automotive parts supply industry, loose engine manufacturers, large truck manufacturers, and nonroad equipment manufacturers, to the extent that estimates exist in the literature reviewed. The contractor shall comment on how estimates of learning in mobile source sectors compare to estimates of learning in general manufacturing.

The contractor shall develop a best estimate for learning in each of the separate mobile source industries for which research has been identified. Before developing these best estimates, the Contractor shall discuss with EPA WA COR the methodology that will be used to develop these best estimates. The Contractor shall not proceed with development of the estimates before the methodology is approved in written technical direction by the EPA WA COR.

Within 4 weeks of EPA's written approval of the Interim Report described in Task 3, the Contractor shall submit a draft final report containing the analyses called for in Tasks 2 through 4 to the EPA WA COR.

Task 5 – Final Report

EPA will provide the Contractor with comments on the draft final report; these comments may include comments from external peer reviewers. The Contractor shall then prepare a final report based on the draft final report described above in Subtask 4b and taking into account the comments provided by EPA. The Contractor shall provide a summary to the EPA WA COR of its responses to substantive comments (i.e., comments that go beyond minor edits) from external

reviewers, if external peer review comments are provided. The final report shall be submitted within 4 weeks of receipt of the comments provided by the EPA WA COR on the draft final report (SubTask 4b).

Weekly Meetings

The contractor shall hold weekly meetings with the WA COR or Alternate WA COR by telephone conference. In these meetings, the contractor shall report progress, new or unforeseen circumstances, and raise issues regarding the performance of the work assignment. The WA COR or Alternate WA COR shall respond to questions, provide information and raise or clarify technical issues.

Deliverables

The Contractor shall deliver the following work products to the EPA WA COR during the course of this work assignment:

- Interim Report, Task 2 - The Contractor shall deliver an interim report to the EPA WA COR describing and summarizing the findings of Task 2 of the work assignment. The Contractor shall deliver the draft report in Microsoft Word format.
- Interim Report, Task 3 - The Contractor shall deliver an interim report to the EPA WA COR describing and summarizing the findings of Task 3 of the work assignment. The Contractor shall deliver the draft report in Microsoft Word format.
- Draft Final Report, Task 4 - The Contractor shall deliver draft final report to the EPA WA COR describing and summarizing the findings of Tasks 2 through 4 of the work assignment. The Contractor shall deliver the draft final report in Microsoft Word format.
- Final Report, Task 5 – After responding to or incorporating the comments provided by EPA on the draft final report, the Contractor shall prepare and submit a final report. The Contractor shall submit the final report four weeks after receipt of comments from EPA on the Task 4 draft final report.
    - Responses to Comments from External Peer Reviewers, Task 5 – if EPA has the draft final report peer reviewed, the Contractor shall provide responses to the substantive peer review comments. These responses shall be submitted within 4 weeks of receiving all comments from EPA along with the Final Report.

Schedule

Item	Duration	Deliverable due upon completion of task
Task 1	6 business days	Memorandum/email that identifies Advisor Advisor resume
Task 2	20 business days, inclusive of Task 1	Interim Report: - List of studies of learning in manufacturing - List of studies of learning in mobile source manufacturing - List of most relevant studies of learning in mobile source manufacturing
	10-20 business days	EPA review and comment on Task 2 Interim Report
Task 3	20 business days	Interim Report: - Summaries of most relevant studies of learning in mobile source manufacturing
	10-20 business days	EPA review and comment on Task 3 Interim Report
Task 4	20 business days	Draft Final Report: - Interim report Task 2 - Interim report Task 3 - Synthesis of reports on learning in mobile source manufacturing (Task 4)
	20-40 business days	EPA review and comment on Task 4 Draft Final Report
Task 5	20 business days	Final Report - Revisions as appropriate in response to EPA comments

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-09

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Cost Reduction through Learnin

Contractor: ICF Incorporated, L.L.C.

Specify Section and paragraph of Contract SOW: Tasks 2b and 2i

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:
This Work Assignment Amendment 1 cancels the stop work order issued on May 8, 2014 for WA 2-09. ICF shall resume work on WA 2-09 in its entirety as specified in the attached Performance Work Statement to this amendment. All other tasks and subtasks not specifically referred to therein shall remain unchanged.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Anthony Neam (Signature) (Date)	Branch/Mail Code:	
	Phone Number: 734-214-4201	
	FAX Number:	
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code:	
	Phone Number: 734-214-4285	
	FAX Number: 734-214-4821	
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code:	
	Phone Number: 513-487-2831	
	FAX Number: 513-487-2109	
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code:	
	Phone Number: 513-487-2046	
	FAX Number:	

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-09, Amendment 1
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Cost Reduction through Learning in Manufacturing Industries and in the Manufacture of Mobile Sources
Period of Performance:	October 1, 2013 – September 30, 2014

Work Assignment Manager (WAM):	Anthony Neam 734-214-4201 neam.anthony@epa.gov
Alternate WAM:	Gloria Helfand 734-214-4688 helfand.gloria@epa.gov

Background

Since the late 1990s, EPA's Office of Transportation and Air Quality (OTAQ) has included a learning effect when estimating the costs of regulatory packages. Specifically, technology costs—for technologies added to mobile sources to allow for compliance with new emissions standards—are estimated to decrease in the years following first implementation. This decrease in technology costs, either due to the volume of production or to time, is considered to be due to learning. Learning may reflect efficiencies gained in production processes, in the design of the manufactured components, or some combination of each. These may result from phenomena such as learning by doing, technological innovation, or other mechanisms.

This learning effect has been studied by academia and industry for more than 60 years. Many studies are available that examine the learning effect, or aspects of it; the vast majority of these studies conclude that cost reductions through learning do, in fact, occur. Other studies assume

that cost reductions will occur based on the body of evidence suggesting that they do and incorporate learning effects into their analysis, as EPA does in its cost analyses.

While there is little doubt that this learning effect occurs, the learning estimates used by OTAQ in its cost analyses are based on somewhat dated studies that are not specific to the mobile source sector(s). Therefore, the goal of this work assignment is to develop a single compendium study on industrial learning in the mobile source sector(s) that can be relied on as the basis for this effect in future cost analyses.

Scope

The purpose of this work assignment amendment is to provide an assessment of learning, as it relates to the mobile source sector, which meets the highest academic and professional standards of credibility. To this end, Task 6 is added, and sub-task 2d and Tasks 3, 4, and 5 are amended as follows. All other tasks and subtasks not specifically referred to in this amendment shall remain unchanged.

Task 2 – Conduct a Literature Review of Studies Conducted Concerning the Learning Effect in Mobile Source Manufacturing Industries

Task 2 generally consists of assembling and reviewing published studies and literature on the learning effect in manufacturing in general and the mobile source sector specifically. The subject matter expert (SME) selected under Task 1 shall provide significant support in identifying relevant studies and articles.

Within 2 weeks of receipt of EPA approval of its work plan, the Contractor shall submit to the EPA WA COR for review and approval the lists of all studies identified in Subtasks 2a and Subtask 2b, and those deemed most relevant in Subtask 2c. This report shall include a brief assessment by the SME as to whether the range in types of learning and mobile source sector categories covered by the studies and articles listed is sufficient to support the development of robust observations about learning effect in the mobile source manufacturing sector. EPA will review and provide comments within 2 weeks of receipt of this interim report.

Task 3 – Summarize Research Conducted, Results and Conclusions of those Studies Deemed to be the Most Relevant

Task 3 consists of summarizing the studies assembled on the lists described in Subtask 2, as described below. The SME shall provide significant support in identifying relevant articles and in summarizing and synthesizing the knowledge contained in those articles. For the purpose of this task, the aspects of learning being examined shall include but not be limited to: learning-by-doing, technological change, increasing productivity, and such other effects identified in the studies. The summaries shall specify whether the focus of the analysis is changes in costs as cumulative output increases, changes in costs over time, or other metrics identified in the studies.

The SME, with the assistance of the Contractor, shall summarize each of the studies assembled on the lists described in Subtasks 2a and 2c. The individual summaries shall include detailed descriptions of at least the following information:

- Citation (authors, date, publication data)
- Specific industry/mobile source sector examined
- Research question
- Type of learning effect examined
- Description, including year(s), of data set used
- Description of methodology used
    - Quantitative or qualitative
    - If quantitative, model type and statistical methods
- Conclusions, including any quantitative estimates of learning effects
- Contractor's assessment of the study
    - Are the conclusions supported by the data analysis, historical material, case studies, statistics, etc
    - Strengths/weaknesses
- Such other information as the Contractor and subject matter expert deem necessary to perform the analysis described in Subtask 4

In addition to the individual study summaries, the SME, with the assistance of the Contractor, shall provide a memo that briefly describes: the extent to which the body of literature contained in the studies identified in Task 2a and 2c shows a general agreement about the existence of learning in general and in the mobile source sector specifically; the different forms of learning that have been studied (including but not limited to: learning-by-doing, technological change, increasing productivity, and other effects identified in the studies); the range of values for empirical estimates of learning in general and the different forms of learning; and the robustness of these findings.

The SME, with the assistance of the Contractor, shall summarize each of the studies assembled on the list described in Subtask 2b. The individual summaries shall include detailed descriptions of at least the following information:

- Citation (authors, date, publication data)
- Specific industry/mobile source sector examined
- Type of learning effect examined; research question
- Whether methodology is quantitative or qualitative
- Conclusions, including any quantitative estimates of learning effects

Within 4 weeks of EPA's approval of the Interim Report described in Subtask 2d, the Contractor shall submit a report containing the summaries described in Subtasks 3a and 3b to the EPA WA COR. The summaries may be provided in tabular form or by a separate electronic data sheet for each study, but shall allow for easy comparison across studies. This report shall also include the memo described in Subtask 3a. EPA will review and provide comments within 2 weeks of receipt of this interim report.

Task 4 – Synthesis of Learning Literature

Task 4 consists of drawing together the information assembled in Tasks 2 and 3 to describe the impacts of learning in general manufacturing and the mobile source sector specifically, and to estimate the magnitude of those effects. The SME shall provide significant support in this aspect of the analysis.

The SME, with the assistance of the Contractor, shall synthesize the body of literature gathered in Tasks 2 and 3. For general manufacturing and for each mobile source sector for which there is information, this analysis shall indicate the occurrence of learning in the relevant sector, describe the types of learning observed and the magnitude of each, and report the magnitude of the estimated combined effects of different types of learning on production costs. Where possible for the mobile source sector, the discussion shall identify estimates of learning separately for the original equipment automotive industry, the automotive parts supply industry, loose engine manufacturers, large truck manufacturers, and nonroad equipment manufacturers, to the extent that estimates exist in the literature reviewed. The synthesis shall also compare estimates of learning in mobile source sectors to estimates of learning in general manufacturing.

The SME, with the assistance of the Contractor, shall develop a methodology to estimate the impacts of learning using the quantitative estimates and other data from the Task 2c studies. The Contractor shall receive approval of the methodology in written technical direction from the EPA WA COR. The development of the estimates in Subtask 4c utilizing this methodology shall not proceed before such written technical direction is received.

Using the methodology approved in subtask 4b, the SME, with the assistance of the Contractor, shall develop a best estimate for learning for each of the separate mobile source industries for which published data exists. For those sectors for which published data does not exist, the SME, with the assistance of the Contractor, shall recommend whether and how the information gathered in Tasks 2 and 3 can be used to describe the impact of learning in those sectors.

Within 4 weeks of EPA's approval of the Interim Report described in Subtask 3c, the Contractor shall submit to the EPA WA COR a report containing the assessment described in Subtask 4a, the methodology described in Subtask 4b, and learning effects estimated in Subtask 4c. This report shall also include a brief assessment by the subject matter expert with regard to his or her evaluation of the robustness of the estimated learning impacts for each of the relevant mobile

source sectors, and implications of those estimates for those mobile source sectors for which estimates were not possible. EPA will review and provide comments on this interim report within 2 weeks of receipt of this interim report.

Task 5: Draft Final Report

Within 4 weeks of EPA's written approval of the Interim Report described in Task 4d, the Contractor shall submit a draft final report containing the work called for in Tasks 2 through 4 to the EPA WA COR. EPA will review and provide comments on this interim report within 4 weeks of receipt of this interim report.

Task 6 – Final Report

After EPA provides the Contractor with comments on the draft final report, the Contractor shall then prepare a final report based on the draft final report described above in Task 5 taking into account the comments provided by EPA. The Contractor shall submit the final report within 4 weeks of receipt of the comments provided by the EPA WA COR on the draft final report.

Weekly Meetings

The contractor shall hold weekly meetings with the WA COR or Alternate WA COR by telephone conference. In these meetings, the contractor shall report progress, new or unforeseen circumstances, and raise issues regarding the performance of the work assignment. The WA COR or Alternate WA COR shall respond to questions, provide information and raise or clarify technical issues.

Deliverables

The Contractor shall deliver the following work products to the EPA WA COR during the course of this work assignment:

- 1st Interim Report, Task 2 - The Contractor shall deliver an interim report to the EPA WA COR as described in Task 2 of the work assignment, including the list of articles described in that task. The Contractor shall deliver the draft report in Microsoft Word format.
- 2nd Interim Report, Task 3 - The Contractor shall deliver an interim report to the EPA WA COR as described in Task 3 of the work assignment, including the summaries of the articles described in that task. The Contractor shall deliver the draft report in Microsoft Word format.
- 3rd Interim Final Report, Task 4 - The Contractor shall deliver an interim report to the EPA WA COR as described in Task 4 of the work assignment. The Contractor shall deliver the draft report in Microsoft Word format.
- Draft Final Report, Task 5 - The Contractor shall deliver a draft final report to the EPA WA COR combining the results of Tasks 2 through 4 of the work assignment. This draft final report shall incorporate EPA's comments on the interim reports. The Contractor shall deliver the draft final report in Microsoft Word format.
- Final Report, Task 6 – After responding to or incorporating the comments provided by EPA on the draft final report, the Contractor shall prepare and submit a final report. The Contractor shall deliver the final report in Microsoft Word format.

Schedule

Item	Duration	Deliverable due upon completion of task
Task 1	6 business days	Memorandum/email that identifies Subject Matter Expert Subject Matter Expert resume
Task 2	20 business days, inclusive of Task 1	1st Interim Report: - List of studies of learning in general manufacturing - List of studies of learning in mobile source manufacturing - List of most relevant studies of learning in mobile source manufacturing
	10 business days	EPA review and comment on 1st Interim Report
Task 3	20 business days	2nd Interim Report: - Summaries of most relevant studies of learning in mobile source manufacturing - Summaries of studies representing an overview of learning in general manufacturing - Brief assessment of the state of the literature
	10 business days	EPA review and comment on 2nd Interim Report
Task 4	20 business days	3rd Interim Report: - Synthesis of mobile source sector learning literature - Methodology to estimate learning effects in mobile source sector - Estimate of learning effects in mobile source sector
	10 business days	EPA review and comment on 3rd Interim Report
Task 5	20 business days	Draft final report: - Description of identification of subject matter expert (Task 1) - 1st Interim report (Task 2) - 2nd Interim report (Task 3) - 3rd Interim report (Task 4)
	20 business days	EPA review and comment on draft final report
Task 6	20 business days	Final Report - Revisions as appropriate in response to EPA comments

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-10

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Recording Aircraft Operations

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 7a

Purpose:
- ☒ Work Assignment
- ☐ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/14/2013 To 01/31/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2014		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Meredith Pedde (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4748 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-10
Title:	Recording Aircraft Operations at General Aviation Airports with Lead Monitors
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 14, 2013 – January 31, 2014
Work Assignment Manager (WAM):	Meredith Pedde Tel: (734) 214-4748 Fax: (734) 214-4939 pedde.meredith@epa.gov
Alternate WAM:	Rich Cook Tel: (734) 214-4827 cook.rich@epa.gov

Background

Tetraethyl lead is used as an additive in aviation fuel for most piston-engine powered aircraft. Lead (Pb) emissions from the use of leaded aviation gasoline accounts for approximately half of the air emission inventory for lead. In October 2006, EPA received a petition from Friends of the Earth (FOE) requesting that the Agency find that aircraft lead emissions may reasonably be anticipated to endanger the public health or welfare, and to take action to control lead emissions from piston-engine aircraft. FOE also requested that if there was insufficient information, EPA should commence a study of the issue. This work builds on three earlier EPA work assignments and continues EPA's investigation and study of lead emitted by piston-engine aircraft and the potential impact on public health and welfare.

This work assignment builds on three previous work assignments: Work Assignments No. 0-10 and 1-10 under EPA contract EP-C-12-011 and Work Assignment No. 3-66 under EPA contract EP-C-09-009. The data collected under Work Assignments No. 3-66, 0-10 and 1-10 shall be used to complete the tasks detailed in this work assignment. However, the contractor shall not duplicate any work previously performed.

TASKS

Task 1: Finalize Reports

Under this task, ICF shall produce a third version of the draft report, completed under and describing analyses conducted for WA 3-66 under EPA contract EP-C-09-009 and WAs No. 0-10

and 1-10 under EPA contract EP-C-12-011. After receiving and incorporating EPA comments and edits to the 3rd version of the draft report, ICF shall then produce a final version of the report. The final report shall document all aspects of these work assignments, including the data collection efforts, emission inventory development, and modeling tasks. It shall summarize the results of the modeling tasks, and include conclusions about the model performance, the relative impact of aircraft emissions compared with other sources on local lead air quality concentration (e.g., roadway sources of Pb compared with avgas fueled aircraft sources) and the role of different aircraft modes of operation on local lead ambient air concentrations.

Task 2: TSP Lead Monitoring and Vapor Phase Monitoring at One Airport

Under this task, ICF shall continue to collect ambient air samples for lead in TSP and continue to conduct monitoring for vapor-phase alkyl lead at San Carlos Airport in San Carlos, California, both of which began under WA 1-10 under EPA contract EP-C-12-011.

Subtask 2(a) - TSP Lead Monitoring

ICF shall complete the 2 weeks of sampling at one location near the run-up area for runway 30, which began under WA 1-10 under EPA contract EP-C-12-011. Sampling shall occur daily during airport operation hours, resulting in a total of 14 sampling days per location, with 24-hr samples obtained from midnight to midnight. To meet this 24-hr schedule, two samplers will be needed at each sample location in order to allow personnel to change filters during daytime hours. Filter samples shall be changed out at approximately the same time on each of the days with the operating parameters documented in logs and on the sample chain-of-custody forms.

For consistency with past work, Mini-Vol samplers, manufactured by Aermetrics and operated in the TSP mode with only the rain caps and no impactors, shall be utilized at all sites. Nominal flow rates for Mini-Vols are 5 liters/minute. The samples shall be analyzed using the XRF (X-ray fluorescence) analysis method. Four blank samples per airport shall be carried through the process and analyzed during the program. Calibrations of all of the equipment shall be performed using certified flow standards. Lead and bromine samples shall be analyzed using X-ray Fluorescence (XRF) on Teflon® filters, to be consistent with past work. Additionally, meteorological data shall be collected using a portable wind measurement system at a location near the air monitors, for the duration of the monitoring effort. Three meter vector wind speed and direction and scalar wind speed shall be recorded and reported in both 60-min and 5-min averages.

Subtask 2(b) - Vapor Phase Monitoring

In addition to the TSP lead monitoring, ICF shall continue monitoring for volatile lead compounds (begun under WA 1-10 under EPA contract EP-C-12-011), also near the run-up area for runway 30. Samples shall be obtained daily such that a total of ten days in total are sampled. Sampling shall occur from 0700 – 2200 LST and 2200 – 0700 LST, representing daytime (airport normal operating hours) and nighttime airport activity (airport normally closed except for emergency landing).

MiniVol samplers shall be used to collect the particulate lead as described above. Volatile alkyl-lead shall be collected using sorbent tubes. Sorbent tubes shall be collected in pairs, with one sorbent tube used for total volatile alkyl-lead, and one for speciated volatile alkyl lead. A suitable programmable pump shall be used for drawing sample air through the sorbent tubes. For consistency with past work, all volatile samples shall be analyzed by the Wisconsin State Laboratory of Hygiene, Environmental Health Division. Filter samples shall be analyzed using XRF.

Subtask 2(c) - Report

A draft and final report shall also be prepared for the lead air monitoring task as described above. The discussion and analysis shall include a summary of the potential range in contribution of alkyl lead to total lead concentrations for those locations where co-located monitors collected TSP lead and vapor phase alkyl lead as well as summary information on the monitored concentrations from the filter analyses, meteorological data collected, and documentation on any issues or problems that may have occurred during the data collection.

Task 3: Collection of NCDC Meteorological Data

For EPA to evaluate the most frequently used runway end at airports across the country, under WA 1-10 under EPA contract EP-C-12-011, ICF began downloading NCDC 1-minute Automated Surface Observing System (ASOS) data (available at: ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/) for all sites that have data for 2011 and January – March 1, 2012 (March 1, 2012 is needed in order to capture all of February 2012, given that the standard Integrated Surface Hourly Data (ISHD) is in GMT and AERMET converts to local time). Under this work assignment, ICF shall continue downloading the data and shall then run the 1-minute ASOS data through AERMINUTE to generate hourly averaged wind speed and wind direction data by station, day, and hour for the 424 days. For hours without ASOS data, ICF shall replace that observation with the standard hourly ASOS observation so that there are hourly observations for each station – day – hour record in the dataset. The standard hourly ASOS data can be processed through AERMET stage 1 to make it easier to read standard observations and to merge hours.

An example of one record of desired data output is shown below:

ASOS Station NCDCID	ASOS Station Call	ASOS Station Name	Year	Month	Day	Hour (LST)	Wind Speed	Wind Direction	Data Source (either STD or AER)
20019437	FRG	Farmingdale AP	2012	1	1	1	2.34	300	STD

ICF shall organize the data such that it is contained in multiple excel files; each separate excel file shall contain the data for 50 ASOS stations. It will therefore contain ~500,000 records (50 ASOS stations X 424 days X 24 hours = 508,800).

DELIVERABLES

Quality Assurance Project Plan (QAPP): The QAPPs provided to EPA under Work Assignment No. 0-10 and 1-10 under EPA contract EP-C-12-011 may be used as a starting point to satisfy the QAPP requirements for this work assignment. The contractor shall update the QAPP to account for any new tasks included in this work assignment. The contractor shall not commence work involving environmental generation data or use until the EPA WAM has approved the QAPP.

The schedule for task deliverables is as follows:

Task 1 Deliverable: Final report	December 31, 2013
Task 2 Deliverable: Monitoring results and report	January 31, 2014
Task 3 Deliverable: Meteorological Data Collection	December 31, 2013

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-10

☐ Other ☒ Amendment Number: 000001

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Recording Aircraft Operations

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 7a

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/14/2013 To 04/30/2014

Comments:
The purpose of this work assignment amendment is to delete Task 2 from the original Performance Work Statement and extend the period of performance to April 30, 2014. All other tasks and requirements in this work assignment shall remain the same. Please remove Task 2 and submit a revised work plan.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2014 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Meredith Pedde (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4748 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-10
Title:	Recording Aircraft Operations at General Aviation Airports with Lead Monitors
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 14, 2013 – April 30, 2014
Work Assignment Manager (WAM):	Meredith Pedde Tel: (734) 214-4748 Fax: (734) 214-4939 pedde.meredith@epa.gov
Alternate WAM:	Rich Cook Tel: (734) 214-4827 cook.rich@epa.gov

Background

Tetraethyl lead is used as an additive in aviation fuel for most piston-engine powered aircraft. Lead (Pb) emissions from the use of leaded aviation gasoline accounts for approximately half of the air emission inventory for lead. In October 2006, EPA received a petition from Friends of the Earth (FOE) requesting that the Agency find that aircraft lead emissions may reasonably be anticipated to endanger the public health or welfare, and to take action to control lead emissions from piston-engine aircraft. FOE also requested that if there was insufficient information, EPA should commence a study of the issue. This work builds on three earlier EPA work assignments and continues EPA's investigation and study of lead emitted by piston-engine aircraft and the potential impact on public health and welfare.

This work assignment builds on three previous work assignments: Work Assignments No. 0-10 and 1-10 under EPA contract EP-C-12-011 and Work Assignment No. 3-66 under EPA contract EP-C-09-009. The data collected under Work Assignments No. 3-66, 0-10 and 1-10 shall be used to complete the tasks detailed in this work assignment. However, the contractor shall not duplicate any work previously performed.

TASKS

Task 1: Finalize Reports

Under this task, ICF shall produce a third version of the draft report, completed under and describing analyses conducted for WA 3-66 under EPA contract EP-C-09-009 and WAs No. 0-10

and 1-10 under EPA contract EP-C-12-011. After receiving and incorporating EPA comments and edits to the 3rd version of the draft report, ICF shall then produce a final version of the report. The final report shall document all aspects of these work assignments, including the data collection efforts, emission inventory development, and modeling tasks. It shall summarize the results of the modeling tasks, and include conclusions about the model performance, the relative impact of aircraft emissions compared with other sources on local lead air quality concentration (e.g., roadway sources of Pb compared with avgas fueled aircraft sources) and the role of different aircraft modes of operation on local lead ambient air concentrations.

Task 2: TSP Lead Monitoring and Vapor Phase Monitoring at One Airport

This task has been deleted from this work assignment. The contractor shall not include this task in their subsequent, revised work plan.

Task 3: Collection of NCDC Meteorological Data

For EPA to evaluate the most frequently used runway end at airports across the country, under WA 1-10 under EPA contract EP-C-12-011, ICF began downloading NCDC 1-minute Automated Surface Observing System (ASOS) data (available at: ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin/) for all sites that have data for 2011 and January – March 1, 2012 (March 1, 2012 is needed in order to capture all of February 2012, given that the standard Integrated Surface Hourly Data (ISHD) is in GMT and AERMET converts to local time). Under this work assignment, ICF shall continue downloading the data and shall then run the 1-minute ASOS data through AERMINUTE to generate hourly averaged wind speed and wind direction data by station, day, and hour for the 424 days. For hours without ASOS data, ICF shall replace that observation with the standard hourly ASOS observation so that there are hourly observations for each station – day – hour record in the dataset. The standard hourly ASOS data can be processed through AERMET stage 1 to make it easier to read standard observations and to merge hours.

An example of one record of desired data output is shown below:

ASOS Station NCDCID	ASOS Station Call	ASOS Station Name	Year	Month	Day	Hour (LST)	Wind Speed	Wind Direction	Data Source (either STD or AER)
20019437	FRG	Farmingdale AP	2012	1	1	1	2.34	300	STD

ICF shall organize the data such that it is contained in multiple excel files; each separate excel file shall contain the data for 50 ASOS stations. It will therefore contain ~500,000 records (50 ASOS stations X 424 days X 24 hours = 508,800).

DELIVERABLES

Quality Assurance Project Plan (QAPP): The QAPPs provided to EPA under Work Assignment No. 0-10 and 1-10 under EPA contract EP-C-12-011 may be used as a starting point to satisfy the QAPP requirements for this work assignment. The contractor shall update the QAPP to account for any new tasks included in this work assignment. The contractor shall not commence work involving environmental generation data or use until the EPA WAM has approved the QAPP.

The schedule for task deliverables is as follows:

Task 1 Deliverable: Final report	April 30, 2014
Task 2 Deliverable: Monitoring results and report – TASK DELETED	xxx
Task 3 Deliverable: Meteorological Data Collection	April 30, 2014

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-10

☐ Other ☒ Amendment Number: 000002

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Recording Aircraft Operations

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 7a

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/14/2013 To 07/31/2014

Comments:
The purpose of this work assignment Amendment 2 is to extend the period of performance to 7/31/14. No additional costs are expected as a result of this extension. No further action by the Contractor is required.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2014		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Meredith Pedde (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4748 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-10 Amendment 2
Title:	Recording Aircraft Operations at General Aviation Airports with Lead Monitors
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 14, 2013 – July 31, 2014
Work Assignment Manager (WAM):	Meredith Pedde Tel: (734) 214-4748 Fax: (734) 214-4939 pedde.meredith@epa.gov
Alternate WAM:	Rich Cook Tel: (734) 214-4827 cook.rich@epa.gov

ACTION:

This amendment extends the period of performance of this work assignment, WA 2-10, through 7/31/2014. No additional costs are expected as a result of this extension.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-10

☐ Other ☒ Amendment Number: 000003

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2015	Recording Aircraft Operations
	Base Option Period Number 2	

Contractor	Specify Section and paragraph of Contract SOW
ICF Incorporated, L.L.C.	Task 7a

Purpose:
- ☐ Work Assignment
- ☒ Work Assignment Amendment
- ☐ Work Plan Approval
- ☐ Work Assignment Close-Out
- ☐ Incremental Funding

Period of Performance: From 11/14/2013 To 09/30/2014

Comments:
This amendment 3 extends the period of performance to September 30, 2014 and adds Task 4 to WA 2-10. All other tasks remain unchanged.

☐ Superfund — Accounting and Appropriations Data — ☒ Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2015		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Meredith Pedde (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4748 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-10, Amendment 3
Title:	Recording Aircraft Operations at General Aviation Airports with Lead Monitors
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 14, 2013- September 30, 2014

Work Assignment Manager (WAM):	Meredith Pedde Tel: (734) 214-4748 Fax: (734) 214-4939 pedde.meredith@epa.gov
Alternate WAM:	Rich Cook Tel: (734) 214-4827 cook.rich@epa.gov

ACTION:

This amendment extends the period of performance of this work assignment, WA 2-10, through 9/30/2014. This amendment also adds task 4, as described below.

BACKGROUND

Tetraethyl lead is used as an additive in aviation fuel for most piston-engine powered aircraft. Lead (Pb) emissions from the use of leaded aviation gasoline accounts for approximately half of the air emission inventory for lead. In October 2006, EPA received a petition from Friends of the Earth (FOE) requesting that the Agency find that aircraft lead emissions may reasonably be anticipated to endanger the public health or welfare, and to take action to control lead emissions from piston-engine aircraft. FOE also requested that if there was insufficient information, EPA should commence a study of the issue. This work builds on three earlier EPA work assignments and continues EPA's investigation and study of lead emitted by piston-engine aircraft and the potential impact on public health and welfare.

This work assignment builds on three previous work assignments: Work Assignments No. 0-10 and 1-10 under EPA contract EP-C-12-011 and Work Assignment No. 3-66 under EPA contract EP-C-09-009. The data collected under Work Assignments No. 3-66, 0-10 and 1-10 shall be used to complete the tasks detailed in this work assignment. However, the contractor shall not duplicate any work previously performed.

TASKS

This work assignment amendment adds Task 4. All other tasks remain unchanged.

TASK 4: Lead concentration and air quality factor data

ICF shall report 24-hour lead concentration values, 3-month average lead concentration values (calculated using 24-hour daily concentration values), and 24-hour lead concentration values per LTO. The concentrations and LTOs shall come from the actual LTO activity used to produce the full 2010 air dispersion modeling results completed under Work Assignment No. 3-66 under EPA contract EP-C-09-009, task 7, at the Reid-Hillview Airport.

The following data shall be produced, as described below; each category of data generated (A, B, C, and D) shall be provided to EPA in a separate Microsoft Excel workbook and each bulleted item in each category shall be a separate worksheet. The workbooks for categories A, C, and D shall also include the daily averages of wind speed (scalar and vector), wind direction, mixing height, and temperature. All data for categories A, B, and C shall be provided for the following locations: monitor 1 location and the max receptor downwind from the monitor 1 location at the following distances (meters): 50, 100, 150, 200, 250, 300, 400, and 500.

A. 24-hour lead concentration data:

- 24-hour lead concentrations for each day in 2010 from only runway 31R single-engine full LTOs
- 24-hour lead concentrations for each day in 2010 from only runway 31R multi-engine full LTOs
- 24-hour lead concentrations for each day in 2010 from only runway 31L single-engine touch-and-go LTOs
- 24-hour lead concentrations for each day in 2010 from only runway 31L multi-engine touch-and-go LTOs

B. 3-month rolling average lead concentration data:

- 3-month rolling average lead concentrations for 2010 from only runway 31R single-engine full LTOs
- 3-month rolling average lead concentrations for 2010 from only runway 31R multi-engine full LTOs
- 3-month rolling average lead concentrations for 2010 from only runway 31L single-engine touch-and-go LTOs
- 3-month rolling average lead concentrations for 2010 from only runway 31L multi-engine touch-and-go LTOs

C. 24-hour air quality factor (AQF) data:

- 24-hour lead concentrations for each day in 2010 from only runway 31R single-engine full LTOs divided by that day's single-engine full LTOs at only runway 31R (i.e., 24-hour single-engine full LTO AQF)
- 24-hour lead concentrations for each day in 2010 from only runway 31R multi-engine full LTOs divided by that day's multi-engine full LTOs at only runway 31R (i.e., 24-hour multi-engine full LTO AQF)

- 24-hour lead concentrations for each day in 2010 from only runway 31L single-engine touch and go LTOs divided by that day's single-engine touch-and-go LTOs at only runway 31L (i.e., 24-hour single-engine rwy. 31L touch-and-go LTO AQF)
- 24-hour lead concentrations for each day in 2010 from only runway 31L multi-engine touch-and-go LTOs divided by that day's multi-engine touch-and-go LTOs at only runway 31L (i.e., 24-hour multi-engine rwy. 31L touch-and-go LTO AQF)

In order to understand the near-field impact of touch-and-go operations, the data listed below shall be produced and provided to EPA. The data shall be provided for the receptor to the east of runway 31L (between runways 31L and 31R) that has the maximum concentration from runway 31L activity as well as the 8 receptors that are downwind from that maximum receptor. This will enable EPA to understand and extrapolate the air quality impact of touch-and-go activity to a single runway airport.

D. Maximum impact of touch and go activity:

- 24-hour lead concentrations for each day in 2010 from only runway 31L single-engine touch-and-go LTOs
- 24-hour lead concentrations for each day in 2010 from only runway 31L multi-engine touch-and-go LTOs
- 3-month rolling average lead concentrations for 2010 from only runway 31L single-engine touch-and-go LTOs
- 3-month rolling average lead concentrations for 2010 from only runway 31L multi-engine touch-and-go LTOs
- 24-hour lead concentrations for each day in 2010 from only runway 31L single-engine touch-and-go LTOs divided by that day's single-engine touch-and-go LTOs at only runway 31L (i.e., 24-hour single-engine 31L touch-and-go LTO AQF)
- 24-hour lead concentrations for each day in 2010 from only runway 31L multi-engine touch-and-go LTOs divided by that day's multi-engine touch-and-go LTOs at only runway 31L (i.e., 24-hour multi-engine 31L touch-and-go LTO AQF)

DELIVERABLES

Task 4 Deliverable: Lead concentration and air quality factor data September 12, 2014

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-14

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2014 Base Option Period Number 2	Peer Review Support of MOVES

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 11

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 11/13/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
02/01/2012 To 09/30/2014		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Kent Helmer (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4825 FAX Number: 734-214-4821
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2831 FAX Number: 513-487-2109
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-14
Title:	Five Peer Reviews in Support of MOVES2013
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 13, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Kent Helmer, ASD-S89 (734) 214-4825 helmer.kent@epa.gov
Alternate WAM:	William Aikman, ASD-S48 (734) 214-4597 aikman.william@epa.gov

BACKGROUND

Models are generally used to address light-duty vehicle (LDV) fleet-wide emission questions which tend to be too large to study directly but may yield to approximations from smaller sets of real data. For example, models can provide insights into how drivers will change their vehicle operating patterns in response to a required increase in fuel economy across the LDV fleet. EPA's proposed MOVES2013 model is part of a comprehensive EPA approach to address the impacts of light- and heavy-duty vehicles on air quality and public health.

As new policy options are brought forth, there is a need to evaluate the soundness and utility of such policies. The five reports/analyses referenced here for peer review document the result of various inquiries into the nature of fuel and vehicle exhaust and evaporative emission interactions on air quality. Each report details how EPA intends to update its ability to model policy outcomes in MOVES from proposed changes to our understanding of the US vehicle fleet and to help mitigate any adverse air quality impacts associated with future motor vehicle fuels.

SCOPE/ OBJECTIVES

This Work Assignment continues the effort begun by this contractor under contract EP-C-12-011, WA1-14, to peer review each of the five reports/analyses referenced in that Performance Work

Statement, Appendix B.1 through B.5. Having received all of the requested peer reviews from eight of the reviewers and for four of the five reports, the contractor shall complete the final peer review technical reports for each of the four reports begun under WA1-14. Additionally, the contractor shall find peer reviewers and facilitate their review and comment on the fifth report, the MOVES Vehicle Population and Activity ("Fleets") report. The contractor shall complete the final peer review technical report for the "Fleets" analysis.

All five reports/analyses shall be treated as confidential information for the course of the Work Assignments and the materials are to stay within the knowledge of the contractor, peer reviewers and EPA staff. Authorization should be sought through the EPA Project Officer (PO) or Work Assignment Manager (WAM) to discuss the material outside of the context of the peer review(s).

TASKS

The Contractor shall be familiar with the provisions of the Peer Review Handbook to ensure that EPA's peer review guidelines are met. These guidelines, EPA's Science Policy Council Peer Review Handbook, 3rd Ed., can be found at http://www.epa.gov/peerreview/ . Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

A description of the work to be performed by the contractor in this Performance Work Statement follows.

Work Plan

The contractor shall prepare a work plan in accordance with the terms and conditions of the subject contract. It shall include an estimate of hours broken down by task and skill level and a detailed cost estimate. The contractor shall identify whether any potential conflict of interest exists for any part of this work assignment.

Task 1. Selecting Reviewer Candidates for the "Fleets" report

From a list of qualified subject matter experts, the contractor shall select two qualified, independent reviewers to conduct a peer review of the Vehicle Population and Activity ("Fleets") report. The contractor shall update and resend to the EPA WAM the list of the names and affiliations of the selected peer reviewers, each peer reviewer's curriculum vitae or resume and a target start date for each person's peer review. This document was created under WA1-14 as the final memorandum of peer review candidates.

Each of the potential peer reviewers must be independent. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective. (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook). In selecting reviewer candidates, the Contractor shall avoid those with

actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest.

The contractor shall assume, for the purpose of estimating costs, that the documentation to review for each product consists of between 60 to 100 pages of material. It is anticipated that each peer reviewer will spend approximately 25 hours in analysis of the data, assumptions and conclusions, and in writing comments.

A list of known subject matter experts from academia and industry (see following - Appendix "A") has been included in this work statement as a suggested starting point from which to identify the two candidates to participate in this peer review. The list shall not limit the contractor in the identification of potential reviewers but should serve as a "jumping-off point" to begin the search for reviewers.

The contractor shall contact subject matter experts and determine whether each is able to perform the work during the period of performance. At all times, the contractor's personnel shall identify themselves as contractor employees and shall not represent themselves as EPA. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest directly to the EPA Contracting Officer (CO) and WAM.

Acknowledgement of the peer reviewer candidates proposed will be provided by the EPA WAM via written technical direction. The contractor shall not initiate a peer review on a particular report or analysis until such acknowledgement is received. After reviewing the resume and/or curriculum vitae of the final selected peer reviewer candidates, the EPA WAM may disagree with the contractor's assessment of a peer review candidate's apparent suitability (potential for COI, appearance of bias, etc) or qualification requirements for any peer review.

In such a case, the contractor shall identify an alternate from the pool of acceptable peer review candidates and forward details of that candidate to the EPA CO and WAM. To make the review process as credible as possible, the contractor shall not consult the EPA WAM in the choosing of the final peer reviewers from the list of acceptable candidates.

Task 2. Facilitation of "Fleets" Peer Review

The EPA WAM will forward on to the contractor the "Fleets" report and any background materials necessary for the peer review. Further, the EPA WAM will provide a list of suggested charge elements/directed questions for reviewers of the "Fleets" report. The contractor shall begin the actual peer review process by distributing the report and all relevant documents along with a charge letter to the peer reviewers. In the charge to the reviewers, an overall catch-all question shall be included at section end of any prescribed questions in order to capture other comments by the reviewers that were not outlined in the charge. The contractor shall assume that the peer review materials will be electronic and may be distributed by e-mail or FTP site.

Shortly after distributing the charge letter and supporting materials for the "Fleets" report, the contractor shall arrange a teleconference between those peer reviewers it has identified in Task 1 above, the EPA WAM, EPA-identified relevant project-related staff and contractor staff to clarify any questions the peer reviewers may have regarding the written materials. EPA may provide technical and/or background information as necessary on the report under review.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the analysis or model by deadlines set forth in the deliverables schedule below. Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through EPA's WAM. Any answer with regard to a particular peer review product and the question to which it refers shall, in turn, be shared with the other reviewer of that product. It is not necessary, however, that the peer reviewers jointly reach consensus on their findings and recommendations since there may be limited overlap in the peer reviewers' areas of expertise and the charge question(s) on which a reviewer may choose to focus.

At the conclusion of any peer review, the contractor shall gather all review comments to begin drafting a report of the conduct of that peer review. After a brief period for editorial comment, EPA will return each draft report for the contractor to create final versions of each of the individual peer review reports. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that the on-going peer reviews will conform to EPA peer review policy.

Task 3: Documentation for Each of the Five Peer Reviews

For each of the four peer reviews begun under WA1-14, and the "Fleets" report peer review detailed in this Work Assignment, the contractor shall prepare a detailed summary of the means by which reviewers were chosen, the manner in which the review process was administered, and how the peer review was brought to a close. This information is in addition to copies of the reviewers' peer review reports and other supporting documentation, as detailed in this Task. Each summary shall be included as part of each Final Technical Report detailed in Task 4.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization, if applicable, and a statement of any real or perceived conflict(s) of interest. The contractor shall forward these documents on to the EPA WAM in electronic format along with each summary, as detailed in Task 4 deliverables.

Task 4: Draft and Final Technical Report for Each Product Reviewed

For each of the five reports or analyses peer reviewed, the contractor shall develop a draft technical report with a clear and concise introduction of the peer reviewer process for that particular report or analysis followed by a detailed discussion of the work completed, including any issues encountered. The unedited reviewer comments shall also be included with each draft report, along with the resumes/CVs and a signed Conflict of Interest statement for each reviewer. EPA will review all five draft reports and submit any comments back to the contractor.

The contractor shall provide EPA WAM with a final technical report for all five products reviewed, addressing EPA comments, within two weeks of receiving comments on any draft copy. Each report shall be sent electronically in both Microsoft Word (*.doc or *.docx) and Adobe portable document file (*.pdf) formats.

PROJECT STATUS/REPORTING

Weekly Updates: The contractor shall be available for a weekly meeting by teleconference between EPA WAM and contractor staff, if needed, to discuss any on-going issue(s) which may arise in the course of the peer review effort.

Teleconference calls: The Contractor shall provide status updates through phone teleconferences for the EPA WAM or his designated alternate on a bi-weekly basis to summarize the progress made to date. The contractor shall indicate progress achieved in the preceding period, technical issues encountered, solutions to issues (proposed or attempted), and project activity for the next two week period. This report shall include any potential issues or circumstances that arise causing delays in the review process. The contractor shall also report if the project is beginning to exceed the hours or dollars agreed upon in the work plan. The contractor shall initiate additional contact with the EPA WAM, as needed, to resolve questions and discuss any technical issues encountered.

Monthly Status Report: The contractor shall provide a written status report with the monthly invoice sent to EPA's Contracting Officer. The monthly status reports shall track the progress made on each of the tasks/deliverables for each of the products being reviewed. The report shall summarize hours and dollars expended, as well as projections to complete work, on each of the tasks as detailed in the SOW. The report shall include information such as task and subtask names, hours spent, contact information, task start date and deadlines, deliverables, accomplishments, any technical issues encountered, work on-hold status and whether the project is on schedule.

This report shall also include any potential issues or circumstances that may arise causing any delays in the review process. The EPA PO and WAM will notify the contractor in writing regarding any changes to the report format.

DELIVERABLES SCHEDULE

The contractor shall complete deliverables in accordance with the proposed schedule below.

Milestone/Deliverable by Task	Proposed Due Date**
Work Plan Preparation	• Deliver to EPA for approval, in keeping with IAW clauses
Task 1: Fleets Peer Reviewer Selection • Selection of peer review candidates/finalize participation	• Two weeks after work plan approval
Task 2: Facilitation of "Fleets" Peer Review • Charge letter and documents to reviewers • "Kick-off" teleconference (each report/peer review) • Peer reviewer's comments due to contractor	• Five weeks after work plan approval • Six weeks after work plan approval • Nine weeks after work plan approval

Task 3: Documentation of Process • Draft Peer Review process summaries for Rpts 1-4 of WA1-14 • Draft Peer Review process summary for "Fleets" Rpt	• Two weeks after work plan approval • Eleven weeks after work plan approval
Task 4: Draft and Final Technical Reports • Draft technical reports (Rpts 1-4 of WA1-14) • Final technical reports (Rpts 1-4 of WA1-14) • "Fleets" (fifth) final technical report	• Four weeks after work plan approval • Six weeks after work plan approval • Thirteen weeks after work plan approval

****** These dates are subject to negotiation and change as a result of EPA's regulatory schedule, availability of the final Peer Review Charge and review documents, or other factors outside of the WAM's control.

Appendix A:

Lists of Potential Subject Matter Experts/Reviewers*

For the product to be reviewed, the contractor may use the following lists of subject matter experts as a "jumping–off" point from which to assemble the group of candidate peer reviewers. The contractor may pursue individuals identified through the contractor's own resources or query EPA's WAM for additional suggested reviewers, as needed.
* Note: the following lists are not comprehensive.

Population and Fleet Activity Updates:

Nancy A. McGuckin, Travel Behavior Analyst
TravelBehavior.us
(323) 257-5144
Nancy@TravelBehavior.us

Maureen A. Mullen, Sr. Chemical Engineer
TranSystems Corp.
1-800-835-4627
www.transystems.com

Lisa Aultman-Hall PhD, Professor
University of Vermont, School of Engineering & Transportation Research Center (Farrell Hall)
210 Colchester Avenue
Burlington, VT 05405
Tele: 802-656-1312
fax 860-656-9892
laultman@uvm.edu
(Dr. Aultman-Hall is a visiting scholar at the University of California Davis Institute for Transportation Studies for 2012-2013)

Song Bai, Scientist/Manager
Transportation Policy & Planning
Sonoma Technology, Inc.
1455 N. McDowell Blvd., Suite "D"
Petaluma, CA 94954-6503
Telephone: 707-665-9900
FAX: 707-665-9800
sbai@sonomatech.co

Appendix B:

Vehicle Population and Activity Update Report: Elements to be Addressed in the Charge to the Peer Reviewers

This Appendix summarizes the product for which EPA has requested an independent peer review. This introduction contains a brief discussion of concerns which would apply to any Agency peer review. The EPA WAM will forward to the contractor a list of questions to be included in a charge letter directing peer reviewers to those issues of greatest concern to the Agency.

In their comments, reviewers should distinguish between recommendations for clearly defined improvements that can be readily made based on data or literature reasonably available to EPA and improvements that are more exploratory or dependent on information not readily available to EPA. Any comment should be sufficiently clear and detailed to allow a thorough understanding by EPA or other parties familiar with the analysis or the underlying data. Further, each peer review should address whether appropriate conclusions and implications can be drawn from either or both the report and any subsequent model predictions based on the report contents.

If a reviewer has questions about what is required in order to complete this review or needs additional background material, please direct the reviewer to contact the contractor's project manager for this effort. If a reviewer has a question about the conduct of the EPA peer review process itself, please have the reviewer contact Ms. Ruth Schenk in EPA's Quality Office, National Vehicle and Fuel Emissions Laboratory by phone (734-214-4017) or through e-mail at schenk.ruth@epa.gov .

EPA requests that the reviewers not release the materials for peer review or the reviewer's comments to anyone else until the Agency makes its report and supporting documentation public.

Report Description:

This report documents changes to assumptions about the US national highway vehicle fleet population and activity data for the next version of the MOVES model. Fleet population and activity data is used to convert emission rates into emission inventory values and then is used to weight individual values into aggregated emission rates. The report also covers the techniques and methods used to map and distribute population and activity data into the categories used by the MOVES model.

Topics addressed by the report include:

- Default source use type data for the national highway vehicle population is being updated with vehicle registration data from Polk for calendar year 2011 and with usage data from the Vehicle Use and Inventory Survey (VIUS) for calendar years 2000, and later;
- Calendar year 2011 as a new base year from which any future population and activity scenarios are grown;

- Vehicle miles traveled (VMT) is being updated from recent Highway Performance Monitoring System (HPMS) data for the 2011 base year, and updating the projections for future years;
- National default speed distributions by road type are being updated based on recent data obtained from a GPS (for passenger cars) provider; and
- Monthly motorcycle VMT distribution is being updated to better reflect the seasonal nature of motorcycle use.
- New driving cycles are included for medium and heavy-duty vehicles at low and high speed
- New Source Classification Codes (SCC) are developed which are more consistent with MOVES classifications of motor vehicles and fuels
- New default geographic distribution of VMT, population, age, road type are included from the 2011 National Emission Inventory.
- New road type (Ramps) are included in MOVES

Estimated effort: approximately 20 hours / 100 pages

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-15

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2016 Base Option Period Number 2	Peer Review - Evaporative OBD

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Section 11

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 11/21/2013 To 09/30/2014

Comments:

[ ] Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) [ ]

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2016 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee — LOE:

Cumulative Approved: — Cost/Fee — LOE:

Work Assignment Manager Name: Connie Hart (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	734-214-4340
	FAX Number:	
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	734-214-4285
	FAX Number:	734-214-4821
Other Agency Official Name: Connie Hart (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	734-214-4340
	FAX Number:	
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	513-487-2046
	FAX Number:	

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-15
Title:	Peer Review of "Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data"
Issuing Office:	US Environmental Protection Agency 2000 Traverwood Drive Ann Arbor, MI 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Period of Performance:	November 21, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Constance Hart, ASD Tel: (734) 214-4340 Fax: (734) 214-4821 hart.connie@epa.gov
Alternate WAM:	Kent Helmer, ASD Tel: (734) 214-4825 Fax: (734) 214-4821 helmer.kent@epa.gov

BACKGROUND

Gasoline vehicles are equipped with evaporative emissions control systems that control vapor from the fuel storage system while a vehicle is sitting or driving. When these systems or the vehicle's gasoline delivery system malfunction, excessive evaporative emissions can be emitted. Few estimates of the frequency of vehicles with evaporative emissions malfunctions, or leaks, in the fleet exist. These vehicles can have a significant impact on the hydrocarbon (HC) emissions inventory.

The report for review analyzes onboard diagnostics (OBD), specifically for evaporative emissions related diagnostic trouble codes (DTCs) data from a diverse selection of States.

CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this work assignment are consistent with the work authorized in Section 11 of the contract's statement of work.

The report under review is to be treated as confidential information for the course of the review and the materials are to stay within the knowledge of the contractor, peer reviewers and EPA

staff. Permission should be sought through the EPA WAM to discuss the material outside of the context of the peer review(s).

SCOPE/ OBJECTIVES

EPA's peer review guidelines specify that all highly significant scientific and technical work products shall undergo independent peer review per specific agency protocols. To assure the use of the highest quality science in its predictive assessments, the contractor shall conduct an independent peer review for this report. By so doing, EPA seeks to assure its stakeholders that this analysis/study has been conducted in a rigorous, appropriate and defensible way.

The contractor shall identify a group of independent subject matter experts and facilitate each member's review and comment on the subject report. In most cases, the reviewers shall have one or more areas of expertise in order to assure a robust peer review.

TASKS

The Contractor shall be familiar with the provisions of the Peer Review Handbook to ensure that EPA's peer review guidelines are met. These guidelines, EPA's Science Policy Council Peer Review Handbook, 3rd Ed., can be found at http://www.epa.gov/peerreview/ . Further, OMB's Information Quality Bulletin for Peer Review and Preamble (found in the EPA's Peer Review Handbook, Appendix B) contains provisions for the conduct of peer reviews across federal agencies and may serve as an overview of EPA's peer review process and principles.

Work Plan

The contractor shall prepare a work plan in accordance with the terms and conditions of the subject contract. It shall include an estimate of hours broken down by task and skill level and a detailed cost estimate. The contractor shall identify whether any potential conflict of interest exists for any part of this work assignment.

Task 1. Selecting Reviewer Candidates for Product Being Reviewed

The contractor shall develop a list of qualified subject matter experts from which to select three qualified independent peer reviewers who will conduct the peer review of the "Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data" report and through their input shall address all/most of the assumptions used in the report/analysis. The contractor shall prepare and deliver to the EPA WAM a list that includes the names and affiliations of the selected peer reviewers, each peer reviewer's curriculum vitae or resume and a target start date for each review.

Each of the potential peer reviewers must be independent. EPA defines an "independent peer reviewer" as an expert who was not associated with the generation of the specific work product either directly by substantial contribution to its development or indirectly by significant consultation during the development of the specific product. The independent peer reviewer, thus, is expected to be objective. (For further information, see Sections 1.2.6 and 1.2.7 of EPA's Peer Review Handbook). In selecting reviewer candidates, the Contractor shall avoid those with actual or apparent conflict(s)-of-interest that would preclude an independent review. Sections 3.4.5 and 3.4.6 of the Handbook can be referenced for avoidance of conflict(s) of interest.

The contractor shall assume, for the purpose of estimating costs, that the documentation to review consists of between 60 to 100 pages of material. It is anticipated that each peer reviewer will spend approximately 25 hours in analysis of the data, assumptions and conclusions and in writing comments.

A list of known subject matter experts from academia and industry (see Appendix "A") has been included in this work statement as a suggested starting point from which to identify reviewers to participate in the peer review. The list shall not limit the contractor in the identification of potential reviewers but should serve as a "jumping –off point" for potential reviewers. At all times, the contractor's personnel shall identify themselves as contractor employees and shall not represent themselves as EPA employees. In addition, the contractor shall identify any actual, potential, or apparent conflicts of interest directly to the EPA Contracting Officer (CO) and EPA WAM.

The contractor shall contact subject matter experts and determine whether each is able to perform the work during the period of performance. The contractor shall request a response that indicates the candidate peer reviewer's interest and confirms his or her availability to perform the work during the period of performance. The contractor shall also ask any candidate peer reviewer to attach their resume or curriculum vitae to any response. In addition, the contractor shall ask the candidate peer reviewers to disclose any actual or apparent conflict(s) of interest (COI).

To make the review process as credible as possible, the contractor shall not consult the EPA WAM in the determination of the final selection of peer reviewers. Acknowledgement of the peer reviewer candidates proposed will be provided by the EPA WAM via written technical direction. The contractor shall not initiate a peer review until such acknowledgement is received. The EPA WAM may disagree with the contractor's assessment of a candidate's qualifications for any particular product to be reviewed. In such a case, the contractor shall identify an alternate from the pool of acceptable peer review candidates.

Task 2. Facilitation of Each Peer Review

The EPA WAM will forward on to the contractor all the material for the review.

The contractor shall begin the actual peer review process by distributing a charge letter and the relevant documents to the peer reviewers. Suggested charge elements and directed questions for each product are provided in Appendix "B". Additional information on the charge elements will be provided by the EPA WAM via written technical direction. In the charge to the reviewers, an overall catchall question shall be included at section end of any prescribed questions in order to capture other comments by the reviewers that were not outlined in the charge. The contractor shall assume that the peer review materials will be electronic and may be distributed by e-mail or FTP site.

Shortly after distributing the charge letter and supporting materials for the subject peer review product, the contractor shall arrange a teleconference between those peer reviewers it has identified in Task 1 above, the EPA WAM, EPA-identified relevant project-related staff, and contractor staff to clarify any questions the peer reviewer(s) may have regarding the report/written materials. EPA may provide technical and/or background information as necessary on the particular report or analysis under review.

The contractor shall manage the peer review process to ensure that each peer reviewer has sufficient time to complete their review of the analysis or model by deadlines set forth in the deliverables schedule below. Future questions that a peer reviewer might have shall be directed back through the contractor for resolution through EPA's WAM. Any answer with regard to a particular peer review product and the question to which it refers shall, in turn, be shared with the full group of reviewers. It is not necessary, however, that the peer reviewers jointly reach consensus on their findings and recommendations since there may be limited overlap in the peer reviewers' areas of expertise and the charge questions on which a reviewer may choose to focus.

At the conclusion of each peer review initiated under this work assignment, the contractor shall gather all review comments to create a draft report of the conduct of the peer reviews. After a brief comment period, EPA will return the draft reports to the contractor to create a final version of the peer review report. The Contractor shall adhere to the provisions of EPA's Peer Review Handbook guidelines to ensure that the on-going peer reviews will conform to EPA peer review policy.

Task 3. Draft and Final Technical Report Peer Review Process

The contractor shall develop both a draft and a final version of a technical report which details the work completed including discussion of any issues encountered. The contractor shall prepare an introduction with a clear and concise overview of the comments made by the peer reviewers to the report. The draft final report shall include a written summary of all comments. The unedited reviewer comments shall also be submitted in the report along with the resumes/CVs and a signed Conflict of Interest statement from each reviewer.

The contractor shall include the means by which reviewers were chosen, the manner in which the review process was administered, and how the peer review was brought to a close. This document is in addition to copies of the reviewers' peer review reports and other supporting documentation, as detailed in this work assignment.

A cover letter shall be provided with each peer reviewer's submittal. This cover letter shall clearly state the reviewer's name, the name and address of their organization, if applicable, and a statement of any real or perceived conflict(s) of interest. The contractor will forward these documents to the EPA WAM in electronic format, as they are received from reviewers.

EPA will review the draft report and submit comments to the contractor.

The contractor shall provide the EPA WAM with the final technical report, addressing EPA comments, within one week of receiving comments on the draft copy. The report shall be sent electronically in both Microsoft Word (*.doc or *.docx) and Adobe portable document file (*.pdf) formats.

PROJECT STATUS/REPORTING

Teleconference calls: The Contractor shall provide status updates through phone teleconferences for the EPA WAM or his designated alternate on an as needed basis. The contractor shall initiate contact with the EPA WAM, as needed, to resolve questions and discuss any technical issues encountered. The contractor shall include any potential issues or

circumstances that arise causing delays in the review process. The contractor shall also report if the project is beginning to exceed the hours or dollars agreed upon in the work plan.

Monthly Status Report: The contractor shall provide a written status report with the monthly invoice sent to EPA's Contracting Officer. The monthly status reports shall track the progress made on each of the tasks/deliverables for each of the products being reviewed. The report shall summarize hours and dollars expended on each of the tasks as detailed in this work statement. The report shall include information such as task and subtask names, hours spent, contact information, task start date and deadlines, deliverables, accomplishments, any technical issues encountered, work on-hold status and whether the project is on schedule.

This report shall also include any potential issues or circumstances that may arise causing any delays in the review process. The EPA Project Officer and WAM will notify the contractor in writing regarding any changes to the report format.

DELIVERABLES SCHEDULE

The contractor shall complete deliverables in accordance with the proposed schedule below.

Milestone/Deliverable by Task	Proposed Due Date**
Work Plan Preparation	• Deliver to EPA for approval, in keeping with IAW clauses
Task 1: Reviewer Selection • Peer reviewer selections for panel • Begin contacting prospective panel members to finalize participation of members on panel	• Two weeks after work plan approval
Task 2: Facilitation of Peer Review • Receive resumes; forward peer reviewer qualifications to EPA • Charge letter and documents to reviewers • "Kick-off" teleconference (each report/peer review) • Peer reviewer's comments due to contractor	• One week after agreement from any peer reviewer • Week of 12/9/2013 • Within one week of receipt of materials • 1/24/2014
Task 3: Draft and Final Technical Reports • Draft technical report • Final technical report	• 2/1/14 • 2/14/14

** These dates are subject to negotiation and change as a result of EPA's regulatory schedule, availability of the final Peer Review Charge and review documents, or other factors outside of the WAM's control.

Appendix A

Lists of Potential Experts/Reviewers*

The contractor may use the following list of subject matter experts as a "jumping–off" point from which to assemble a group of candidate peer reviewers. The contractor may pursue individuals identified through the contractor's own resources or query EPA's WAM for additional suggested reviewers, as needed.

* Note: the following list is not comprehensive.

Gene Tierney
765 Ahukini Street
Honolulu, HI 96825
202-340-7553
Gene.Tierney@OpusInspection.com

Michael McCarthy
California Air Resources Board
626-771-3614
mmccarth@arb.ca.gov

Michael St. Denis
Revecorp, Inc.
5732 Lonetree Blvd
Rocklin, CA 95765
(916) 786-1006
Michael@Revecorp.com

Appendix B

Charge to Peer Reviewers of *Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data*

Gasoline vehicles are equipped with evaporative emissions control systems that control vapor from the fuel storage system while a vehicle is sitting or driving. When these systems or the vehicle's gasoline delivery system malfunction, excessive evaporative emissions can be emitted. Few estimates of the frequency of vehicles with evaporative emissions malfunctions, or leaks, in the fleet exist. These vehicles can have a significant impact on the hydrocarbon (HC) emissions inventory.

This report pulls together five states of data for an analysis of the evaporative emissions related on-board diagnostics (OBD) codes.

You are asked to review and provide expert comments on the *Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data*.

In your comments you should distinguish between recommendations for clearly defined improvements that can be readily made based on data or literature reasonably available to EPA and improvements that are more exploratory or dependent on information not readily available to EPA. Your written comments should address all aspects of the report (methodologies, analysis, conclusions, and narrative) and should be sufficiently clear and detailed to allow readers to thoroughly understand their relevance to the subject report. In addition to addressing these issues, EPA encourages you to best apply your particular area(s) of expertise to review the overall study. ***Please deliver your final written comments to xxx by xxx, xxx.***

All materials provided to you as well as your comments should be treated as confidential, and should neither be released nor discussed with others outside of the review panel. Once EPA has made its reports and supporting documentation public, EPA will notify you that you may release or discuss the peer review materials and your review comments with others.

Some specific areas of focus include the following:

1. Does the report meet its primary goal?

2. Is the description of analytic methods and procedures clear and detailed enough to allow the reader to develop an adequate understanding of the steps taken and assumptions made to develop the tables and figures in the report? Are examples selected for tables and figures well chosen and designed to assist the reader in understanding the approach and methods?

3. Does the methodology, data, and analyses support the report's conclusion?

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-17

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2016 Base Option Period Number 2	Aircraft CO2 Cost Analysis

Contractor: ICF INCORPORATED, L.L.C.

Specify Section and paragraph of Contract SOW: Task 6 Aircraft Analysis

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/01/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 02/01/2012 To 09/30/2016 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Bryan Manning (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4832 FAX Number:
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code: Phone Number: 734-214-4285 FAX Number: 734-214-4821
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code: Phone Number: 513-487-2046 FAX Number:

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-17
Issuing Office:	EPA Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Completion of Aircraft CO_2 Cost Analysis for Technology Improvements to New In-Production Aircraft
Work Assignment Manager (WAM):	Bryan Manning 734-214-4832 manning.bryan@epa.gov
Alternate WAM	John Mueller 734-214-4275 mueller.john@epa.gov

BACKGROUND

The International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP) is expected to decide on the stringency options (or levels) to be analyzed for an aircraft CO2 standard in November 2013. Next, CAEP will begin assessing these stringency options for their technical feasibility, cost, and emission reduction potential -- to adopt a CO2 standard in late 2015 or early 2016. However, work is still needed to inform CAEP future decisions regarding the applicability of the CO2 standard to new in-production aircraft. In regard to this work, there exists a need to assess the technological improvements to new in-production aircraft that are feasible and their corresponding (and potential) CO2 emission reductions and costs.

The potential use of alternative compliance mechanisms such as "Averaging and Banking" (AB), in place of the traditional CAEP pass/fail criteria, have been proposed by some members in the CAEP working group. Thus, technical assistance is needed for the development of an AB system for the aircraft CO2 standard. This includes determining how to optimize technological improvements (and/or technology) and minimize costs in the AB system.

This work assignment 2-17 ("WA 2-17") is a continuation of work assignment 1-17 ("WA 1-17") of EPA contract EP-C-12-011. Under WA 1-17, the contractor assessed technological improvements to new in-production aircraft and their corresponding costs. However, due to delays

in the CAEP work program, a decision on stringency options will now not occur until November 2013 (as described earlier). As a result of the delay, the contractor was unable to analyze the specific stringency options from CAEP, as specified in WA 1-17. The contractor was only able to assess the preliminary range of stringency options provided by CAEP. The final stringency options are likely to be different than the preliminary range of options. Thus, under WA 2-17, the contractor shall analyze the final CAEP agreed-upon stringency options (which will be the November 2013 stringency options). This includes modifying the assessment of preliminary stringency options from the previous analysis in WA 1-17.

In addition, because of the delays in the CAEP work program (as described earlier), the contractor was unable to develop an AB system for the aircraft CO2 standard, as specified in WA 1-17. This work shall be completed under this work assignment.

DESCRIPTION OF TASKS

Task 1 (similar to WA 1-17, Task 2). Cost Analysis of Technological Improvements for New In-Production Aircraft

The contractor shall review the previous assessment of costs of fuel burn improvements (from WA 1-17) on a per-aircraft model and per-manufacturer basis (with per-engine cost estimates also specified for the aircraft) for individual technologies analyzed above for the time periods 2016 through 2020 and 2023 and later. (The contractor shall consult with the EPA WAM on potential alternative time periods before beginning work.) Also, the contractor shall evaluate the earlier analysis (from WA 1-17) of the cumulative cost of utilizing these technologies (on a per-aircraft and per-manufacturer basis) for these same time periods. CAEP has agreed to utilize a cruise-based metric system to measure and report aircraft CO2, and the contractor shall include improvements to the metric system (along with the fuel burn improvements) in this cost analysis.

In addition, the contractor shall develop a "cost-surface" (or cost-curve) method for estimating costs (particularly non-recurring costs) across a wide range of aircraft sizes and fuel burn and CO2 metric value improvements. The method shall consist of a single cost curve that is a function of metric value improvement and aircraft maximum take-off mass (MTOM). As much as possible, the costs associated with CO2 improvements shall be differentiated from non-CO2 costs, and full program costs shall not be included in the costs estimates.

Then, the contractor shall assess the feasibility (technologies needed), costs, and emission reductions (from technology to achieve stringency option) associated with each of the November 2013 CAEP stringency options. This assessment shall be conducted on both a per-aircraft and per-manufacturer basis (cost per aircraft and for each manufacturer to meet each stringency option; and emission reductions per aircraft and per manufacturer associated with these costs/technologies) -- including jointly identifying the aircraft category (as described below), manufacturer (or aircraft), and accompanying engine.

The contractor shall review the previous cost assessment (from WA 1-17) of technological improvements by aircraft categories (e.g., turboprop, business jet, regional jet, single aisle, small twin aisle, large twin aisle, and large quad) when analyzing costs on a per-aircraft basis. The contractor shall consult with the EPA WAM before potentially modifying this assessment.

The contractor shall consult with the EPA WAM before potentially changing their methods for assessing costs for these technologies from the previous analysis (including consulting with the EPA WAM on the assessment of stringency options). The contractor shall provide a technical report to the EPA WAM on the results of this task.

Task 2 (similar to WA 1-17, Task 3). Develop an Averaging and Banking System

AB is an alternative compliance mechanism (in place of the traditional CAEP pass/fail approach) intended to incentivize early implementation of fuel efficient technologies over a wide range of aircraft types. AB allows the CO2 standard to be met on average by an aircraft manufacturer rather than requiring each aircraft type (or aircraft model) to be below the stringency line (or standard). This is done by earning credits from more efficient aircraft below the stringency line that can be utilized to offset debits from less efficient aircraft above the stringency line. AB provides manufacturers more discretion in determining their individualized strategy and timing for compliance, compared to the traditional CAEP pass/fail approach for standards.

The contractor shall develop an averaging and banking system for the aircraft CO2 standard and provide an assessment of how to optimize technological improvements and minimize costs in the AB system -- relative to pass/fail approach. This assessment shall include the associated cost and benefits (CO2 emissions reduction) with the technological improvement approach in the AB system. The contractor shall consult with the EPA WAM on the approach used to develop the technology responses and costs in the AB system -- relative to those in the pass/fail approach.

The contractor shall consult with the EPA WAM before deciding on their methods for developing the AB system (including consulting with the EPA WAM on options for an averaging or stringency line(s)). The contractor shall provide a technical report to the EPA WAM on the results of this task.

In addition, for Tasks 1 and 2, the contractor shall travel to at least two CAEP meetings to make presentations on the results of these reports (and the cost curve), as provided in written technical directions by the EPA WAM. The first CAEP meeting would be February 24-28, 2014 in Seattle, and the second meeting would be May 12-16, 2014 in Hague, Netherlands. The contractor shall participate in 2 to 3 days of each of these week-long meetings. The presentations shall be in PowerPoint format and about 1 hour in duration. In the presentations, the contractor shall describe the methods and results of their assessments, including tables and figures as needed.

Task 3 (similar to WA 1-17, Task 4). Peer Review of Technical Report

The contractor shall identify at least two aircraft technology and cost experts to separately peer review the cost curve method for estimating costs from Task 1. These experts shall have substantial experience with assessing costs of new in-production technology, and they shall be familiar with the ICAO/CAEP processes. In addition, the contractor shall find two peer reviewers of the AB system developed in Task 2; these peer reviewers can be different than the peer reviewers for Tasks 1. The contractor shall have the peer review experts provide reviews of draft versions of the cost curve and Task 2 reports (draft reports as well as the final reports) so that there is an opportunity to revise the report based on the input from the peer reviewers. In addition, the

contractor shall have the peer reviewers develop a memorandum summarizing their views of the draft versions of the cost curve and reports -- and the final reports. Based on these peer reviewer memorandums and consultations with EPA, the contractor shall provide a final technical report to the EPA WAM on the results of Tasks 1 (including the cost curve) and 2. The contractor shall consult with the EPA WAM before deciding on the peer reviewers. However, the final decision on selection of the particular peer reviewers shall be made by the contractor.

There is a metric values database (MVdb) and project aircraft metric value database (PAMVdb) for the CAEP CO2 Standard Task Group. The MVdb and PAMVdb are based on data from the aircraft manufacturers, and they consider this data in to be proprietary in nature. Thus, the contractor shall ensure that the confidential business information provisions of this contract are met to ensure the confidentiality of the data. The peer reviewers would likely not have permission to access the MVdB and the PAMVdb, and thus, the proprietary nature of the data needs to be maintained in some manner by the contractor for these peer reviews. The contractor shall consult with the EPA WAM on this issue prior to sending the cost curve and technical report (draft and final reports) to the peer reviewers.

DELIVERABLES

Kick off Meeting

Within one week after receipt of the work assignment, and prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

Quality Assurance Project Plan (QAPP)

The contractor shall submit a draft QAPP to the EPA WAM within 2 weeks of receipt of Work Plan approval. The QAPP approved under WA 1-17 of this contract may be used as a model if there are no substantial changes due to this WA 2-17. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The EPA WAM shall review and comment on the QAPP. The contractor shall incorporate recommended changes and suggestions received before proceeding with technical work associated with the tasks below. A final QAPP shall be submitted within 2 weeks of receipt of EPA comments on the draft QAPP. Information on completing a QAPP can be found at http://epa.gov/quality/qs-docs/r5-final.pdf (general requirements) and http://epa.gov/quality/qs-docs/g5-final.pdf

The final QAPP shall cover all aspects of this test program as outlined on the EPA quality website. The QAPP shall have an appendix containing all applicable standard operating procedures (SOPs). The contractor shall adhere to all applicable SOPs and the QA procedures recommended therein.

Technical Reports and Memorandums

See Schedule section below for deadlines. The contractor shall provide the technical reports and memorandums for Tasks 1, 2, and 3 as described below. The contractor shall provide an electronic copy of all reports, memorandums, spreadsheets, supporting materials, etc., to the EPA WAM with the final report (by the deadline listed for the peer reviewers memorandum on the final report in the Schedule section). Electronic copies shall be in formats (e.g., Word, Excel) specified by the EPA WAM in written technical direction.

Bi-Weekly Progress Reports

The contractor shall provide the EPA WAM with brief bi-weekly (every other week) status reports via telephone conference or email during the period of performance. The progress report shall indicate the progress achieved in the preceding weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

SCHEDULE

	Item	Due Date
1	Kick off Meeting	Within 1 week after receipt of work assignment
2	Draft QAPP submitted to EPA	Within 2 weeks of work plan approval
3	Final QAPP submitted to EPA	Within 2 weeks of receipt of EPA comments on draft QAPP
4	Task 1 draft report submitted to EPA WAM	1/15/14
5	Task 1 comments received from EPA WAM	1/29/14
6	Task 1 draft cost curve submitted to peer reviewers	2/12/14
7	Task 1 comments received from peer reviewers	2/28/14
8	Task 1 final report submitted to EPA WAM	3/14/14
9	Task 1 final cost curve submitted to peer reviewers	3/14/14
10	Task 2 draft report submitted to EPA WAM	3/21/14
11	Task 1 final report comments received from EPA WAM	3/28/14
12	Task 1 final cost curve comments received from peer reviewers	3/28/14
13	Task 2 comments received from EPA WAM	4/4/14
14	Task 2 draft report submitted to peer reviewers	4/18/14
15	Task 2 comments received from peer reviewers	5/9/14
16	Peer reviewers memorandum on cost curve and draft report for Task 2	5/23/14
17	Task 2 final report submitted to EPA WAM	6/6/14
18	Task 2 final report comments received from EPA WAM	7/11/14
19	Task 2 final report submitted to peer reviewers	8/1/14
20	Task 2 final report comments received from peer reviewers	8/29/14
21	Final Report on Tasks 1 and 2 (including final cost curve)	9/26/14
22	Peer reviewers memorandum on Final cost curve and Report for Task 2	9/30/14
23	Travel to CAEP meetings (in this time period)	2/3/14 through 9/30/14

NON-DISCLOSURE AGREEMENT

All documentation acquired and/or provided by EPA or generated as a result of this project shall be under the control of the U.S. EPA Assistant Administrator for Air and Radiation, or his or her designated representative, and shall not be released by the Contractor to any other source without specific approval by the U.S. EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 2-22

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-011	02/01/2012 To 09/30/2016 Base Option Period Number 2	Mass and Patricle Losses in an

Contractor	Specify Section and paragraph of Contract SOW
ICF INCORPORATED, L.L.C.	Task 6 Aircraft; Task 12 Technical Support

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 10/31/2013 To 09/30/2014

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee	LOE
Contract Period: 02/01/2012 To 09/30/2016		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee	LOE
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Bob Giannelli (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	734-214-4708
	FAX Number:	
Project Officer Name: Greg Janssen (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	734-214-4285
	FAX Number:	734-214-4821
Other Agency Official Name: Jose Ortiz (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	202-564-6762
	FAX Number:	
Contracting Official Name: Sandra Savage (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	513-487-2046
	FAX Number:	

PERFORMANCE WORK STATEMENT

EPA Contract:	EP-C-12-011
Work Assignment (WA):	2-22
Issuing Office:	US Environmental Protection Agency Office of Transportation and Air Quality (OTAQ) 2000 Traverwood Dr. Ann Arbor, Michigan 48105
Contractor:	ICF International 9300 Lee Highway Fairfax, VA 22031-1207
Statement of Work:	Mass and Number Particle Losses in an Aircraft PM Sampling System - Continuation
Period of Performance:	October 31, 2013 – September 30, 2014
Work Assignment Manager (WAM):	Bob Giannelli 734-214-4708 giannelli.bob@epa.gov
Alternate WAM:	Bryan Manning 734-214-4832 manning.bryan@epa.gov

This work assignment continues work started under Work Assignment 1-22 of this contract. It is expected that the work started under this work assignment will continue into Option Period 3 of this contract.

BACKGROUND

Measurement of particulate matter (PM) emissions from combustion engines is motivated by their detrimental health and welfare effects. PM emissions from combustion sources are chemically complex and, due to their size, have sampling train transport properties different than gaseous emissions and hence need careful consideration. When designing a sampling system for measuring PM emissions, a concern is the inherent sample losses that can take place in the sampling train during transport from the emissions source to the measurement instrument. These losses, due mostly to well understood physical phenomena, can lead to an underestimation of the amount of the actual PM emissions from the combustion source under consideration.

Under the request of the United Nations International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP), the Society of Automotive Engineers (SAE) has established a Standards Committee, named E31, which is developing a sampling system to measure PM emitted from turbo fan aircraft engines. The sampling train has been determined to require sample line lengths and sampling train configurations which lead to what are basically unavoidable sample losses that impact both size and mass measurement. Estimates of the nonvolatile particulate matter (nvPM) mass percent loss in the sample train due to these physical phenomena are >30 percent. Particle number loss estimates are >40 percent.

These large losses lead to a reasonable concern over the accuracy of the measurement method. Hence, the E31 nvPM committee has developed a method by which the nvPM measurements can be adjusted for sample train losses based on estimated particle size distribution and penetration fractions.

This method has been reviewed internally by the E31 committee and by outside experts (EPA contract EP-C-12-011, Work Assignment 1-11). At this point, the line loss method needs to be documented for SAE and eventually for ICAO CAEP as part of a draft test procedure. Hence, the EPA requires assistance in documenting the sample train loss estimation method in a standard format acceptable to the SAE Committee and developing computer models to account and adjust for PM loss under the test procedure being developed.

TASKS

The purpose of this work assignment (WA) is to have experts on aircraft PM measurement assist in the preparation of a draft Aerospace Information Report (AIR) describing the PM loss estimation method and create computer models for PM loss.

Task 1: Provide technical expert for methodology documentation

The contractor shall identify at least one expert on physical and numerical modeling and aircraft engine emissions characterization, who is knowledgeable on measurement of nvPM emissions and analysis of PM loss in the PM measurement sample trains for both mass and particle number measurement. The contractor shall consult with the EPA WAM regarding the expert's qualifications before making a selection; EPA has provided a list of several known experts in the field. This is not an all-inclusive or comprehensive list of subject matter experts, and does not limit the contractor in finding and selecting the technical expert.

The EPA WAM will acknowledge approval of the expert selected on aircraft PM measurement via written technical direction. The contractor shall not consult the EPA WAM in the final determination of the expert selected.

List of known technical experts:
1) Dr. Rick Miake-Lye (Aerodyne Research, Billerica, MA)
2) Dr. David Kittleson (University of Minnesota, Minneapolis, MN)
3) Dr. Ahmad Khalek (Southwest Research Institute, San Antonio, TX)
4) Dr. Max Zhang (Cornell University, Ithaca, NY)
5) DavidS. Liscinsky (United Technologies Research Center, East Hartford, CT)

Task 2: Attend E31 Loss Team Meetings

For the period of this work assignment (see below), the selected expert from Task 1 shall attend weekly E31 loss team teleconference meetings, communicate, and coordinate with loss team members on the loss correction methods.

Task 3: Methodology Development Documentation

The selected expert from Task 1 shall continue to communicate and coordinate with loss team members on the loss correction methods, and shall prepare a draft AIR documenting the methods being developed by the SAE E31 to account and adjust for PM loss in the sample trains for both the mass and number aircraft engine PM measurement under the test procedure being developed by E31.

The AIR should follow the format prescribed by SAE (e.g., http://www.sae.org/servlets/works/). The SAE AIR 6241 may serve as an example of the format, but the contractor shall use his/her knowledge of the topic area and the draft materials prepared by E31 as the basis for identifying section and sub-sections topics.

Task 4: Provide technical expert for model development

The contractor shall identify at least one expert (different from the expert in Task 1) on modeling and aircraft engine nvPM emissions characterization. This expert shall have demonstrated experience with the measurement of nvPM emissions from aircraft engines and the development of PM loss particle penetration fraction models for PM measurement sample trains for both mass and particle number measurement from aircraft engines. The contractor shall consult with the EPA WAM regarding the expert's qualifications before making a selection; EPA has provided a list of several known experts in the field. This is not an all-inclusive or comprehensive list of subject matter experts, and does not limit the contractor in finding and selecting the technical expert.

The EPA WAM will acknowledge approval of the expert selected on aircraft PM measurement via written technical direction. The contractor shall not consult the EPA WAM in the final determination of the expert selected.

List of known technical experts:

1) David S. Liscinsky (United Technologies Research Center, East Hartford, CT)
2) David Y.H. Pui (University of Minnesota, Minneapolis, MN)
3) Heidi Hollick (United Technologies Research Center, East Hartford, CT)
4) Dr. Max Zhang (Cornell University, Ithaca, NY)
5) Dr. Ahmad Khalek (Southwest Research Institute, San Antonio, TX)

Task 5: Develop PM Loss Models

The selected expert from Task 4 shall develop a PM loss model for the SAE E31 to account for and adjust for diffusion and thermophoretic PM losses in the sample trains for both the mass and number aircraft engine PM measurement under the test procedure being developed by E31. (See AIR 6241[1].)

III. DELIVERABLES

1. Kick-off Meeting. Within one week after the Work Assignment is issued, but prior to the Contractor submitting a Work Plan, the Contractor shall discuss this work assignment with the EPA WAM to ensure a common understanding of the requirements, expectations, and ultimate end products.

2. Quality Assurance Project Plan (QAPP). The contractor shall submit a draft QAPP to the EPA WAM within 2 weeks of Work Plan approval. The QAPP shall detail data collection and analysis tasks and procedures for this work assignment. The Contractor shall provide a quality assurance project plan (QAPP) that describes the quality control processes used in support of the tasks. Guidance can be found at: QAPP for use of existing data: http://www.epa.gov/quality/qsdocs/ found-data-qapp-rqts.pdf; Assessment Factors for relevance, applicability, utility of existing data: http://www.epa.gov/spc/pdfs/assess2.pdf; and EPA Requirements for QAPPs: http://www.epa.gov/quality/qs-docs/r5-final.pdf.

EPA will review and provide comments on the draft QAPP. A final QAPP shall be submitted within 15 business days of receipt of EPA comments.

3. Weekly Progress Reports. The contractor shall provide the EPA WAM with brief weekly status reports via telephone conference or email during the period of

[1] http://www.sae.org/servlets/works/committeeHome.do?comtID=TEAE31

performance. The progress report shall indicate the progress achieved in the concluded weeks, technical problems encountered, solutions to those problems, and projected activity for the upcoming weeks. Before proceeding with any solution to a problem, the contractor shall report the problem and consult with the EPA WAM concerning the scope of the solution.

Schedule of Deliverables

Steps	**Completion Date**
Kick Off Meeting	Within 1 week of receipt of Work Assignment
Draft QAPP	Within 2 weeks of receipt of Work Plan approval
Final QAPP	Within 15 business days of receipt of EPA comments on draft QAPP
Complete candidate search Task 1 (Documentation)	October 18, 2013
Complete candidate search Task 4 (Create Models)	October 18, 2013
Attend E31 meetings	September 30, 2014
Prepare Draft AIR	September 30, 2014
Develop PM Loss Models	September 30, 2014

NON-DISCLOSURE AGREEMENT

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